Oct. 11, 1955 J. H. HOGG 2,720,478

METHOD OF MAKING AND FINISHING VENEERS

Filed March 20, 1953

Fig. 1

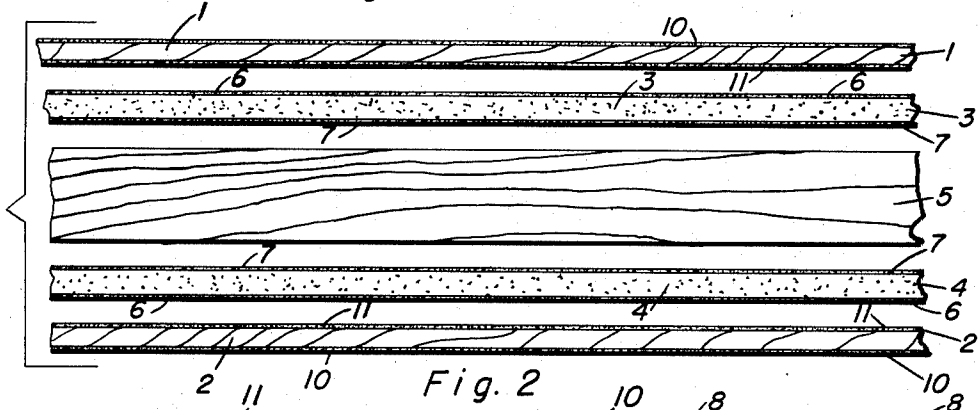


Fig. 2

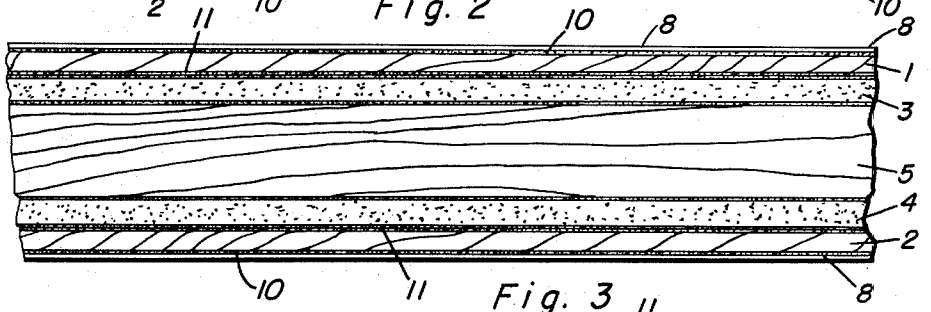


Fig. 3

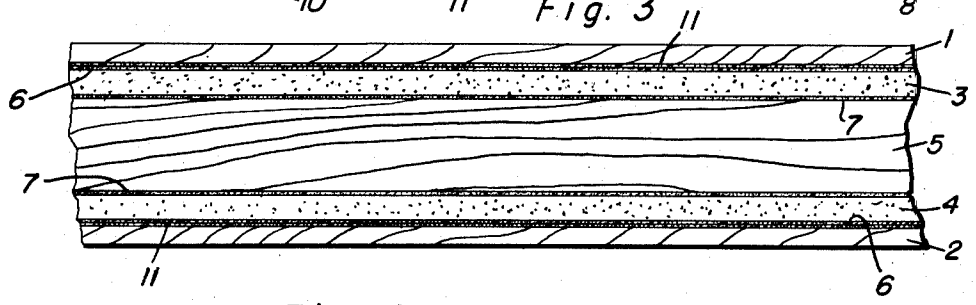
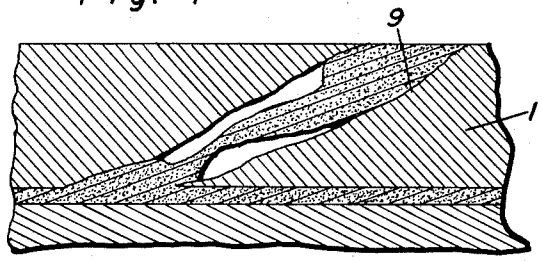


Fig. 4



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METHOD OF MAKING AND FINISHING VENEERS

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12 Claims. (Cl. 154—120)

This invention relates to a process for making and finishing veneer plywood, laminated veneer panels and other composite wood panels and it has for its object to provide a method which can be carried out in a conventional furniture or plywood and furniture producing plant, but which considerably simplifies the finishing process and which permits the elimination of part of the equipment and of a number of operations thus producing a saving of labor and a shortening of the conveyor on which operations are usually carried out.

With a conventional finishing system used when manufacturing furniture (examples of which are described in "Industrial Finishing," February 1952, page 66 ff.) 5-ply-panels, for instance, the face panels of which may or may not have been glue sized, are used and the finish is applied after the piece of furniture has been manufactured from the plywood panel. First the wood is stained the desired color, preferably with a non-grain raising stain, which is then dried for twenty to sixty minutes, whereupon a wash coat is usually sprayed and after drying is sanded. Now follows the filling operation necessary to fill the pores so that they are filled flush with the surrounding wood, the filler being usually in paste form and mixed with some solvent, such as naphtha, and is sprayed or brushed on. After having set it is taken off, the latter operation being usually performed in two phases. After the filler has dried a lacquer sealer is applied, the piece is again sanded and thereafter is stained with a lacquer shading stain. Finally, as many top coats as required are applied.

As seen from the above description of a conventional finishing operation even a simple finishing process is relatively involved and consists of a large number of steps, while in the majority of finishing operations much more complex and involved finishing systems must be used. A simplification of the entire finishing process is therefore clearly a major advantage.

The finishing system according to this invention is characterized by the fact that it starts already with the making and laying of the plywood. The face laminations or veneers and the cross bandings are especially prepared before being joined with the core in a veneer press. The face panel or panels are stained or bleached (according to the desired finish) and, if necessary, are then provided with a protective coating stopping further coloration. Before the plywood is produced by pressing the veneers and the core between rollers, the face panel or panels are covered on both sides with a composition which acts both as an adhesive or glue and as a sealing compound and which may also contain pigments or colors if desired. As the adhesive and sealing compound is applied on both sides it is forced into the pores of the face panel from both sides of the panel by the rollers. These pores may have previously been enlarged by a suitable process. Before, however, putting the panels into the veneer press, a layer of protective and preferably of absorbent material is fastened on the outer side of the face panel, which layer may either only protect against further coloration

or may also absorb the excess sealing compound which may be forced through the pores.

A further step, according to the invention, consists in sanding or otherwise removing the protective layer on the outer veneers after the plywood has been treated as described. The plywood is now ready for being worked into furniture or other objects and the remaining finishing process consists only in "over toning" which comprises staining, glazing, shading and other processes which are however identical with the conventional processes.

As will be seen from this outline of the invention, the process according to the invention omits at least the three first steps of the finishing process such as above described.

The object of the invention is therefore to provide a process which eliminates the difficulties connected with some of the steps of the conventional finishing methods, and especially the steps connected with the conventional filling process which leads to blistering of the top coat, to top coat shrinking and to swelling and puffing, whenever any imperfections in the application of the filler occurs, such imperfections being sometimes due to weather conditions and to other external influences.

As the conventional finishing methods not only include a relatively large number of steps but also include steps which entail many difficulties, a main object of the invention consists in eliminating those steps which are the main source of trouble for the producer.

Therefore, one of the objects of the invention is to provide a process eliminating the conventional method for filling the pores of the wood by means of a paste filler and a solvent, this filling method leading to swelling and puffiing and to an unsatisfactory, so-called "gray" finish, if certain unavoidable imperfections in the application of the filler occur accidentally or as a consequence of a change of conditions, especially of weather conditions influencing the drying.

It is a further object of the invention to provide a finishing method permitting the use of a darker coloring material than hitherto possible in the pores and grains, such darker coloring producing more contrast between the pores and flakes of the wood and thus bringing out the grain pattern with more perfection.

It is a further object of the invention to provide a finishing method which will permit the use of the so-called wild grain type veneers and other veneers which produce effects of special beauty on furniture, but cannot be used in most factories, because this type of wood cannot be properly filled with the conventional methods.

It is a further object of the invention to provide a finishing method which greatly assists in overcoming the problem of adhesion between the different coats which are successively applied, and especially the problem of adhesion between the conventional filler and the conventional wash coat which is solved by the elimination of the wash coat and the filling operation, the method according to the invention producing a top coat of fuller appearance and, by eliminating the lacquer sealer, shellac or oil sealer necessary in connection with conventional methods also produces a more durable coating that will not become brittle with the passage of time.

A further object of the invention consists in providing a finishing method which permits the use of special operations such as the banding of the edges, the application of decalcomania pictures, the use of embossed, stamped and patterned designs with much less difficulty than known processes and which further permits to obtain great economy when panels with an opaque finish are made.

It is a further object of the invention to provide a process and finishing method permitting the use of lower grade veneers and especially veneers which have so-called "pin knots" and minor splits or cracks, which

defects cannot be practically corrected with the conventional methods of finishing but which are corrected according to the invention by filling said knots, splits or cracks with the sealing compound.

It is also a further object of the invention to provide a process in which certain difficult problems occurring in connection with certain woods such as knotty pine or wormy chestnut, which must be solved by special costly and complex treatments, can be solved in a simple manner by using the sealing compound according to the invention to fill the voids.

It is a further object of the method according to the invention to provide a finishing process which allows the use of mitered square frames around the edges of panels, the panel inside the mitered square frame being made of veneer and the mitered frame being made of a solid panel.

It is a further object of the invention to provide a finishing process which allows the use of a combination of solid panels and veneer panels, with the two types of panels used either in construction or separately as parts of the same finished products.

It is a further object of the invention to provide a method of finishing which by eliminating certain operations will also simplify the equipment to be used in connection with said operations, such as, for instance the filler oven and the wash coat oven, as well as the equipment for spraying, brushing and applying the filler and wash coat, said method at the same time also greatly reducing the labor involved for applying coats by reducing the number of coats.

Further and more specific objects of the invention will be apparent from the following detailed specification.

The finishing method according to the invention is described with reference to the accompanying purely diagrammatic drawings, illustrating the various stages of the process. It is to be understood that the drawings are purely diagrammatical, and are not correct with respect to proportions or to scale.

In the drawings:

Figure 1 is an exploded sectional view of a 5-ply panel showing the application of the coatings on both sides of the veneers.

Figure 2 is a diagrammatic sectional view showing a section through a 5-ply panel after it has passed the veneer press.

Figure 3 is a similar view of a 5-ply panel during a following phase of the operation in which the protective layers on the outside have been removed.

Figure 4 is a diagrammatic sectional view on a very much enlarged scale of one of the veneers showing one of the pores of the wood which has been filled with a sealing compound from both sides.

The finishing process according to the invention starts in the stage of building up the plywood and therefore the laying up of the plywood panel forms part of the process according to the invention. The process however does not entail changes in the equipment of making the plywood and therefore it may be practiced, without any change of the equipment, as well in factories making plywood for other producers, as by producers of furniture and of similar products who produce themselves the plywood panels which go into their finished products.

As the process, according to the invention, includes a number of steps starting with the making of the plywood, which are subject to variations and modifications imposed by the nature, type or style of the product, the process, as far as it is essentially or nearly the same for all the various types and styles of products, may first be outlined before examples relating to certain specific products and styles are described.

In the description of the finishing process according to the invention it has been assumed throughout that the process is carried out in connection with a 5-plywood panel which is finished on both sides. Practically the process remains the same if plywoods with more or less veneers are used and the process is of course simplified if only one of the faces of the plywood undergoes finishing, as is sometimes the case in connection with furniture.

Before the plywood is laid up the outer veneers **1, 2** covering the top and the bottom of the panel may first be stained by means of a known dipping or spraying process. If a light finish is to be applied, these outer veneers, instead of being stained, may first be bleached and a sizing coat may be applied so as to prevent any further color, applied during the process, to penetrate into the wood fibers.

A second step, which is however optional, consists in enlarging the pores of the wood in the outer veneers **1, 2** by a process which is very similar to a sandblasting process causing the pores to show up in a more marked manner. The process uses merely compressed air and grit blown against the surface of the veneer and it enhances a decorative effect produced by the grain.

Before the laying up of the veneer which is now about to start, a mixture of adhesive and pigment is spread by rollers or otherwise on both sides of the outer veneers **1, 2**, this adhesive forming a layer indicated at **10, 11** in Figures 1, 2 and 3. The material for this adhesive is so selected that it acts both as a glue or adhesive and as a sealing compound in addition to providing some coloring. The plywood is now laid out according to one of the well known methods. The two cross bandings **3, 4** are run through a glue spreader which spreads an adhesive on both sides of the cross banding, the layers being indicated at **6, 7** in the figures whereupon the five laminations **1, 2, 3, 4, 5** are now laid upon each other and are introduced into a hot (or cold) press until the adhesive is cured and/or dried.

The various laminations are now put into the press, after a sheet of protecting material, for instance, a sheet of porous paper **8**, is laid over the outer faces of the top and bottom layers **1, 2**. Then the pressure and heat is applied and the combined adhesive and filling compound is forced into the pores of the face veneers from the top and from the bottom of the veneer plate thus oozing up from the bottom and penetrating into the veneer face from the top.

The main and important point in this treatment which deviates from the known methods of laying up the veneer and which consists in the use of an adhesive on both sides of the face veneers **1, 2** and in using a compound which is not only a glue or adhesive but which is also a sealing compound.

This process actually fills the pores **9** in the veneer faces of plates **1, 2** from both sides with the sealing compound, thus dispensing with the filler paste and with all preparatory and subsequent steps connected with the application of the filler. The sealing compound, according to the invention, must be so formulated that it can penetrate into the pores. The latter do not run straight from one face to the other, but usually are running in a direction which is inclined towards the faces so that the length of a pore is a multiple of the thickness of the veneer, the pores running at a rather small acute angle relatively to the veneer faces. They are also not quite regular, but the adhesive and sealing compound will nevertheless penetrate sufficiently during the pressing of the plywood in the veneer press so that the sealing compound may ooze through the pores from the back to the front side and also penetrates from the front side towards the back. The filling of the pores from two sides is sufficient to produce a smooth fully satisfactory outer surface which requires only some over toning.

The piece of plywood is now removed from the press. Its outer faces are covered with paper or with a protective layer which paper or other layer protects both the metal plates of the press against getting smeared with the adhesive and the veneer surfaces and it absorbs ex-

cess adhesive and does not permit the bleached or stained surface to be affected by the pigment or coloring matter which may be mixed with the adhesive.

If only plywood panels are manufactured the process of manufacturing them is now complete so that they can be shipped to the producer of furniture or other objects.

All further treatment is now carried out by the manufacturer of the products, such as furniture, using the plywood panels. The step which now follows consists in sanding, by means of a drum sander or belt sander, the panel in order to remove the paper or other protective layer and the excess adhesive. All the adhesive on the outer surfaces as well as the protective layer is removed by the sander so that the stained wood which is provided with filled pores as above described, is now laid bare. Additional sanders (preferably belt sanders) now give the surface a polished and finished appearance. The fibers of the wood are now exposed ready for the finishing operation, but the pores are sealed.

After completion of this sanding operation the panels may now be worked into the final product, for instance, into a piece of furniture, such as a table or cabinet. After the piece of furniture or other object has been completed and assembled it is given a coat of stain in order to equalize the color on all the different panels and woods of which the piece has been made, so as to make them look uniform. The coloring of the wood trims which is sometimes different from that of the panels may now be performed in the conventional manner.

After the above named staining process, aimed at producing a uniform color shading on all panels, a bonding coat is sprayed over the surface of the object or piece of furniture. This is a most important additional step, and this bonding coat has the function to establish the proper bonding between the surface of the wood and the subsequent coatings which were applied on the same.

The bonding coat is now sanded, if necessary. A glazing blending and/or shading operation or several such operations may be performed on top of the bonding coat where the desired finish calls for such operation or operations.

The glazing, blending and/or shading operations are well known conventional finishing operations and they may be combined with other known operations to develop high lights and special effects.

The conventional top coatings are lacquers, varnishes, synthetic varnishes, synthetic resins, enamels of all types, shellacs, waxes and other. A transparent plastic panel may also be applied.

EXAMPLES

In the following examples which relate to specific objects the steps of the process are treated separately insofar as adaptations to a specific case are concerned. The various alternative treatments are designated by different reference letters.

The first step of the process consists in preparing the top and bottom veneers by staining or by bleaching.

a. Treatment for blond finishes.—The veneer must be properly selected for such a finish and it is then bleached by dipping it into a tank of hydrogen peroxide, or by sponging or spraying the veneer with hydrogen peroxide. The veneer is then placed into a sealed chamber filled with ammonia gas and is allowed to stay there for about twelve hours during which time the reaction is usually completed.

b. For an alternative method of bleaching a solution is used containing the following ingredients:

1 gallon of water
6 to 8 oz. of caustic soda
1 to 4 oz. of magnesium sulphate

One part of the above described solution and three parts of hydrogen peroxide are mixed and this mixture is then sprayed or rolled onto the veneer. The veneer may also be treated by dipping it into the solution thus prepared. After the reaction has taken place the veneer is rinsed in a solution having the following composition:

1 gallon of water
2 to 8 oz. of acetic acid

The veneer is then thoroughly dried and can now be treated further.

c. The veneer may also be dipped into a solution of the adhesive that will be used later to lay up the veneer, or this adhesive solution may be sprayed, sponged or brushed on the veneer. The adhesive is usually one prepared from synthetic resin of which several examples will be given later. These resins, according to their type are always reduced in body by using a solvent to the desired extent. The solvent is usually prescribed by the manufacturer of the resin. Instead of a synthetic resin also hide glue may be used, the solvent for such hide glue being water. An example for the last named case would be to use one part of glue to 10 parts of water. The veneer is then allowed to dry and can then be further treated to make plywood in the manner which is described below.

d. A further alternative method consists in mixing a coating material, by using an adhesive containing a synthetic resin and a suitable solvent, this adhesive being used as a binder or vehicle with some pigment being added to it.

A suitable composition is the following:

Adhesive	gallon	1
Solvent or reducer for the adhesive	gallons	11
Titanium dioxide	lbs	1 to 5
Color—a small amount sufficient to produce the correct tint.		

This mix is then sprayed, sponged or brushed on the top side of the face veneer or the veneer is dipped into the solution.

After the above mixture is dried on the face of the veneer it is sanded and is then ready for use. If it is necessary to make the pores more prominent it may be sandblasted with a pigment and an abrasive.

e. For finishes that are not of the light or blond character.

The face veneer in this case may be stained by dipping it into or by spraying or rolling on it a solution of stain to give to the veneer a preliminary or base color.

The solution may have the following composition:

Hot water	gallon	1
Croceine scarlet dye	oz	1
Azo rubine red dye	oz	2
Metanil yellow dye	oz	2
Nigrosine dye	oz	1

Instead of this solution also a commercial non-grain-raising type of stain may be used.

The veneer may also be processed without any preliminary treatment.

When one of the preliminary treatments according to the alternatives *a* to *e* has been completed the next step consists in laying up the plywood with veneers (**1**, **2** in Figures 1 to 3) with cross bandings (**3**, **4** in Figures 1 to 3) and the core stock (**5** in Figures 1 to 3) to form a plywood panel. The laminations of this veneer consist therefore of face veneer, glue line, crossbanding, glue line, core stock, glue line, cross banding, glue line and face veneer.

The adhesive for coating the cross banding and the veneer is now selected. There are many types of adhesive and this process can be carried out with a large number of them.

For the coating of the top and bottom veneer the best type of adhesive for this particular type of work is selected and a sealing compound is made from it. The adhesive is used as a vehicle and the coloring which is ground in or dispersed in this vehicle is added. The mixture must necessarily vary with the type of wood which is used for the piece of furniture and also the color will have to be varied in accordance therewith.

A typical sealing compound formula using urea formaldehyde resin or glue is the following:

Urea formaldehyde resin or glue	lbs	100
Wheat flour	lbs	0–100
Pecan shell flour	lbs	0– 30
Burnt sienna	lbs	0– 20
Carbon black	lbs	0– 10
Croceine scarlet dye	ozs	0– 12
Silica pigment	lbs	0– 20
Calcium carbonate	lbs	0– 20
China clay	lbs	0– 20
Talc	lbs	0–220

To this mixture water, preferably hot water, is added in such a quantity as to make a proper flowing mix which can be spread.

A combination of inert pigments may be added to the sealing compound to aid in sanding the sealing compound layer on the outer face of the veneer. These inert pigments reduce the cohisiveness of the sealing compound vehicle and help keep the sandpaper from getting clogged.

The solvent or reducers used in connection with the sealing compound vary in accordance with the type of adhesive used as a vehicle. For instance, water is used as a solvent for urea formaldehyde types, polyvinyl acetate type, phenol-formaldehyde types and animal glue types of adhesives. Water and alcohol may be used for phenol-formaldehyde types, resorcinol phenol-formaldehyde types and resorcinol formaldehyde types of adhesive, alcohol alone may also be used for the last named types, and butyl alcohol and xylol and/or toluol is used as a solvent for urea-formaldehyde types of adhesive, while hydrocarbons and oil are used for phenol-formaldehyde types and terpene-phenolics types of adhesive.

The spreading is performed with the usual glue spreaders such as rollers, brushings, sponges, etc. On the top veneer it is of advantage to use a plurality of rollers or at least a second roller made of brushes or a brush roller in order to obtain a kind of mechanical sealing action. Also when spreading the adhesive on the top veneer a roller with a design on it, for instance, a metal roller with an engraved grain design, can be used in order to superimpose a grain or other design on the veneer when it is rolled through the spreader, to accentuate the grain design of the wood or to produce some other effect, such as the imitation of a particular wood on wood of another type and the like.

In laying up the 5-ply panel in accordance with this method the first lamination which is the bottom veneer is provided with a sealing compound which is spread on both surfaces. Next the cross banding is laid, after it has been spread with the conventional adhesive which has been rolled or spread on both surfaces. Next, the core stock is put on this pile the adhesive being provided by the cross banding. Next, another cross banding is laid on the core stock after adhesive has been rolled or spread on both surfaces of the cross banding and last the top face veneer which has the sealing compound spread on both surfaces is laid on the last cross banding.

As a modification a sheet of aluminum or some metal may be laid between the face veneers and cross bandings. If such a metal plate is used it is coated in the same way in which any cross banding is coated.

After the various laminations of plywood have now been assembled with their various coatings, the cross banding having the conventional type of adhesive, while the bottom and face veneers carry a sealing compound, they are assembled and put into one of the many types of veneer presses, applying heat and pressure. The pores of the wood on the face veneers are completely sealed and filled with sealing material. A protective sheet of paper, cloth, wood, sheet metal, foil or dry powder is placed over the top face veneer and bottom face veneer in order to protect the plates in the hot or cold press and in order to absorb the excess sealing compound and in order to make subsequent sanding easier by weakening the adhesive action so that the excess glue is not a solid mass but is one that is of a spongy nature and is therefore more easy to sand away. After the assembled plywood panel has been placed in the press and the proper drying cycle is completed a complete panel is formed.

If this process is used in a plant which makes panels for the furniture trade the panel is now ready for shipment to its processor.

The present example now describes further steps in the event that the panel is used to make a piece of furniture.

The panel is now subjected to a sanding operation which is a customary method used on commercial panels. In the present example the sanding operation is used in order to remove the protective layer (for instance the paper), also the upper layer of the sealing compound is at least partly sanded off; but small dots, vein lines and small islands of the sealing material are left in the pores or grains of the wood which dots, veins or islands are surrounded by bare wood from which the sealing compound coating has been removed. If an embossed design has been used when applying the sealing compound, the panel at this point would have the sealing compound in the pores or grains of the wood and also in addition in the embossed design lines.

The sanding operation is usually performed in several stages. The first stage consists in running the panel through a drum sander with rollers coated with sandpaper which may be covered with a coarse grip and which make the initial cut in the veneer. During this operation the protective sheet coating that was put on the veneer will be entirely removed and also most of the sealing compound will be removed except that which is held in the pores and in the grains. In the second step the panels are run through one or more belt sanders, each belt sander, if a plurality is used, having a finer grade of paper on it than the belt sander which precedes. Having passed the belt sanders the panel is left with a smooth surface which is suitable for the application of the finishing material.

The panels now go into a room in which they are assembled into a piece of furniture or cabinet.

In making furniture or cabinets for radios or televisions a so-called "banding" process is used which consists in banding a layer of veneer on the exposed edges of the plywood panels in order to make a more attractive edge and also in order to protect the edges of the panel where the laminations show. To put on a banded veneer according to the example here described the sealing compound is also spread over the piece of veneer to be banded and this piece is put on in the usual manner with or without any additional adhesive. After the banding adhesive sealing compound has dried or has been cured it may be sanded by a portable hand sander or by hand to blend in with the rest of the processed panels.

The composition of the adhesive applied to the banding is the same as that of the adhesive used in the above described veneer making process. In certain cases it may be more convenient to apply the adhesive to the protective layer of paper, to apply it to the banded edge, to cure it with a hot iron and then to sand off the protective layer and the excess sealing agent.

At this point also the solid wood trims which are assembled together with the panels may be processed with the sealing compound in a similar manner to blend in with the rest of the processed panels. This is, however, an optional part of the process and the solid trim parts may also be finished in a conventional finishing procedure.

The conventional finishing system also includes the initial staining process which may also be applied according to the present process. However, the following steps of the finishing process, namely the wash coat application and the filling operation, are eliminated and instead of these steps a bonding coat is applied over the initial staining coat. The bonding coat must adhere to the vehicle used in the sealing compound. After the

bonding coat has been sanded the subsequent coatings may be applied in the conventional manner without any further changes.

The examples of the bonding agent to be used in connection with this invention are taken from a very large number of possible selections. They therefore only represent specimen agents more or less selected at random which however have been tested and found to be tough high grade bonding agents that have excellent adhesive properties and that are extremely durable.

Example A

Universal bonding agent:
- 100 parts by dry weight polyvinyl butyral
- 10–50 parts by dry weight of plastic resins, natural resins or shellac.

Thinner:
- 50% alcohols
- 20% ketones
- 20% ester type solvents
- 10% aromatic hydrocarbons

The solid portion to be thinned to 7 to 15% solids.

Example B

Lacquer type bonding agent:
- 100 parts by dry weight nitrocellulose
- 50–100 parts by dry weight alkyd resin
- 5–10 parts by dry weight zinc stearate (sanding agent)

Thinner:
- 30% ester solvents
- 20% ketones
- 10% alcohols (mostly butonal)
- 20% aromatic hydrocarbons
- 20% miscellaneous solvents and diluents such as naphtha hydrocarbons, chemical plasticizers, oils

The solid portion is to be thinned to 5–20% solids.

Thus it will be seen from the above described examples that the process described has many advantages some of which have already been mentioned. In the first place the process is labor saving as the rubbing in of some of the coats or of the paste filler can be eliminated. Further, as already described the process eliminates top coat blistering which is due to imperfect filling of the pores by a filler or to incomplete drying of the filler. It also helps to reduce top coat shrinkage and by eliminating the filler, it eliminates all the disadvantages connected with this particular phase of the known process.

The process also eliminates some of the adhesion problems. The top coats get a fuller appearance because the under coats have a much beter foundation. On account of this better foundation it is possible to use a lower solid content in the top coats thus reducing the expense for the same. Also a wider range of top coat formulations is possible as the danger of puffing or shrinkage of the filler has been eliminated.

In the process according to the invention a bonding coat is used in place of the conventional sealer. This bonding coat must have adhesion to and be compatible with the sealing compound vehicle used in the veneer. The bonding agent is different from the conventional sealer in that it is lower in solids and has a mere minimum of sanding agent. However many types of bonding agents may be used, such as nitrocellulose and resin base agents, ethyl cellulose and resin base agents, urea formaldehyde and resin base agents, polyester base agents, polyvinyl acetate base agents, etc. The bonding coating is preferably so formulated that it provides a more durable coating than the conventional finishes.

As has already been explained the process according to the invention has additional advantages in special cases. It is possible for instance to use veneers which are full of so-called "pin knots" or small knots and/or of splits or cracks. With the conventional finishing systems these veneers are either not usable or they can only be used after the "pin knots" have been burned in by hand, a process which is seldom used, on account of its extreme expensiveness. With the process according to the invention the holes, cracks or splits are automatically filled by the sealing compound so that no special process is necessary to make veneers of this type usable.

Likewise other types of woods which present similar unusual and difficult conditions may be treated without any expensive pretreatment. Such types are, for instance, knotty pines and wormy chestnuts. The knots which have fallen out have to be replaced by an expensive burning in process entirely carried out by hand, while they are automatically closed by the sealing compound according to the invention, thus extending very materially the types of wood usable as veneers.

Another example of this type is the type of wood which cracks or splits during the veneer cutting process. These cracks or splits are again automatically closed by the sealing compound.

Another advantage of the process is obtained in connection with the use of mitered square frames in which the frame is of solid wood while the panel inside the frame is a veneer panel. The finishing process according to the invention may be applied in connection with any combination of solid panels and veneer panels, whether used in combination or separately which form part of the same finished product. Thus, a simplification which greatly reduces labor and costs is produced. The above advantages were realized also where plastic panels, metal panels or composition panels are part of the combination.

Other advantages have already been described in the preceding specification.

It will be clear that the process must vary in its details in order to conform itself to the type of wood used as well as to the type of goods or objects manufactured from the plywood panel. It is also clear that many unessential changes may be made without in any way departing from the essence of the invention as defined in the annexed claims.

What is claimed as new is as follows:

1. A process for preparing and finishing surfaces of objects made of plywood which consists in covering both the inside and outside of the veneers, applied on the outside of the plywood before the laying of the same with a sealing compound containing an adhesive, in applying on the outwardly turned face of said veneers which are applied on the outside of the plywood a protective layer consisting in an absorbent cellulose product taking up the excess sealing compound, in joining thereafter the veneers and the core of the plywood by application of pressure, thus forcing the sealing compound into the pores of the veneer from the inside as well as from the outside, in removing the protective layer and the adhesive on the outwardly turned face of the veneer, and in then applying a bonding coat and conventional finishing coats over said bonding coat.

2. A finishing process as claimed in claim 1, wherein the veneers applied to the outside of the plywood are first stained before being covered with the adhesive containing a sealing compound.

3. A process as claimed in claim 1, wherein the outwardly turned face of the veneers on the outside of the plywood is subjected to a sanding process for removing the protective layer and the adhesive coating below said layer, thus exposing the bare wood, the pores of which have been filled by the sealing compound.

4. A process as claimed in claim 1, wherein on the outer face of the veneer embossments forming a desired design are produced, said embossments holding the sealing compound and adhesive applied to the outer face of the veneer after removal of the said adhesive and sealing compound from the outer face of the veneer.

5. A process as claimed in claim 2, wherein a metal

sheet covered with adhesive on both sides is inserted between the face veneers and the core stock.

6. A process as claimed in claim 1, wherein the outer face veneers are first stained and then treated in a blasting operation, blowing grit on its surface by means of compressed air in order to enlarge the pores of the outer face.

7. A process as claimed in claim 1, wherein plywood is banded by means of banding strips laid across the edges, the banding strips being first coated with an adhesive containing a sealing compound before being applied to the plywood edges.

8. A process as claimed in claim 1, wherein a sanding agent is added to the sealing compound to allow the excess of the sealing compound to be sanded with greater care.

9. A process as claimed in claim 1 wherein a sanding agent consisting of silicates is added to the sealing compound.

10. A process as claimed in claim 9, wherein the sanding agent is talc.

11. A process as claimed in claim 9, wherein the sanding agent is talc and china clay.

12. A process as claimed in claim 1, wherein the sealing compound is placed on the protective layer first, and the protective layer and the sealing compound is placed on the surface of the veneer simultaneously, to fill the pores and holes in the veneer, and wherein the protective layer is subsequently removed by sanding leaving the surface with filled pores and holes exposed.

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