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NO DRAWINGS

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(54) DECORATIVE BOARDS

(71) We, FUJI KOBUNSHI COMPANY LIMITED, a body corporate organised and existing under the laws of Japan, of No. 135-1, Koaza-Ootani, Ooaza-Terada, Joyo-cho, Kuze, Kyoto, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to decorative boards having an improved appearance with artistic depth.

The invention provides a process of producing a decorative board which comprises impregnating decorative paper with a thermosetting resin comprising diallyl phthalate prepolymer or a mixture thereof with an unsaturated polyester and a prepolymer with an aldehyde of melamine, benzoguanamine, acetoguanamine, urea or polymethylol acrylamide for improving the affinity between the paper and the resin, and hot pressing the impregnated paper onto a board. The improving agent reduces the formation of minute holes through the paper on hot pressing, and so keeps the paper water-tight in use, preventing whitening of the board on contact with water and eventual separation of the paper from the board in this way.

Papers which can be used according to the invention and have transparency or translucency imparted by resin impregnation include those made from, for example, wood pulp, or linter pulp, and those which contain as additives fibrous material, and/or colouring or strengthening agents. When a colour, or design such as the grain of wood, stone, or cloth, or a pattern is printed on the paper a different degree of transparency is created after resin impregnation in the deep-coloured part, in the light-coloured part, and in the unprinted part. Generally the unprinted part becomes more transparent or translucent, so that upon the production of a decorative board the transparency is different from part

to part according to the design on the surface. Thus a decorative effect with considerable depth is achieved.

The materials which improve the affinity between the fibres of paper and the resin may be added in the manufacture of the paper itself, by treating the pulp for example with the materials in the form of a solution, or by coating or immersion of the paper, followed by drying. Alternatively the material can be added to the solution of the resin.

The board materials used according to the invention include veneer board, particle board, hardboard and metal. These board materials can be used as such, but in view of the partial transparency or translucency of the resin-impregnated sheet which causes the surface appearance of the board to be affected by the colour of the base material, it is also possible to use the board materials prepared by coating the surface with colouring material, paint or filling material or by moulding in such a way as to permit intervention of a shadow layer for concealing the inherent colour of the board material resulting from titanium paper coated or impregnated with thermosetting resin. In this treatment of the base material of a board it is necessary to use a material having the affinity toward the resin in the hot compression moulding of the impregnated paper in order to achieve a satisfactory moulding.

Decorative boards produced in accordance with the invention have beautiful depth by virtue of the mutually combined effects of the designs and colours in the resin layer, the reflection and transmission of light in the transparent or translucent parts of the resin layer, and the colours and shades of the base materials. They have improved water-resistance and a good combination the surface hardness, heat-resistance, chemical resistance, weather-resistance, and strength.

The invention is illustrated by the following Examples; all parts and % being by weight unless otherwise indicated.

Example 1

55 g per sq m paper was made by a Fourdrinier machine from bleached kraft pulp to which a yellow colouring material has been added. A design of the grain of teak-wood board was gravured on this paper. A solution of polymethylolacrylamide, prepared by dissolving the resin in a mixed solvent (water: acetone=1:3) so as to give a concentration of 15%, was applied onto the paper in an amount such that 20 g per sq m solid material was added, and dried. The paper obtained was impregnated with a resin solution consisting of 60 parts of diallyl phthalate prepolymer, 40 parts of unsaturated polyester, 3 parts of benzoyl peroxide, 0.3 part of internal mould releasing agent, 75 parts of acetone, and 25 parts of toluene until 57% resin pick up, and dried. The resulting dry sheet was laid on a veneer board 4 mm thick and hot pressed for 8 minutes at 130°C and 15 kg per sq cm. A decorative veneer board having artistic depth in the surface finish was produced.

The decorative board was tested for the water-resistance by the following method: A few drops of water were dropped on the surface and allowed to stand for 1 hour under a watch glass. Upon removal of the watch glass, observation of the surface of the decorative board revealed no whitening.

Example 2

40 g per sq m paper was made from linter pulp by a cylinder paper machine, and a design of the grain of marble was printed thereon. A solution was prepared containing 90 parts of diallyl phthalate prepolymer, 10 parts of diallyl phthalate monomer, 4 parts of benzoyl peroxide, 1 part of internal mould release agent, 80 parts of acetone, and 20 parts of toluene. After adding thereto 4% of methylolated melamine - formaldehyde resin prepolymer for improving the affinity between the impregnated resin and the fibres of paper material in the moulding of decorative board, the paper was impregnated with the resulting mixture until 53% resin pick up, and dried to give a partially translucent decorative sheet. Separately, an 80 g per sq m white titanium paper was impregnated with diallyl phthalate resin until 48% resin pick up, and placed on a particle board. The decorative sheet first prepared was superposed thereon. The product was compression moulded for 15 minutes at 135°C under 15 kg per sq cm pressure. An excellent water-resistant decorative board, having an improved appearance with depth and provided with a design of the grain of marble on the surface, was obtained.

Example 3

A solution of methylolated methylolbenzo-

guanamine resin was applied onto the printed paper used in Example 1 and dried at 15 g per sq m of solid material added to the paper. The resulting paper was impregnated with a resin solution consisting of diallyl phthalate prepolymer 90 parts, diallyl phthalate monomer 10 parts, cumene hydroperoxide 3 parts, internal mould release agent 1 part, octane 80 parts, and toluene 20 parts, and dried to form a sheet with a resin content of 60%. This sheet was laid on a veneer board 4 mm thick and subjected to heat compression for 8 minutes at 130°C and 15 kg per sq cm pressure. An excellent water-resistant decorative plywood with artistic depth in the surface finish was produced.

Example 4

Prepolymer of methylolacetoguanamine methyl ether resin was applied onto the printed paper used in Example 2 and dried. The amount of solid material added to the paper was 25 g per sq m. The resulting paper was impregnated with a resin solution consisting of diallyl phthalate prepolymer 60 parts, unsaturated polyester 40 parts, benzoyl peroxide 3 parts, internal mould release agent 0.5 part, acetone 75 parts, and toluene 25 parts and dried to form a sheet with a resin content of 50%. This sheet was laid on an aluminium sheet 2 mm thick with a coating of epoxy resin and hot pressed for 8 minutes at 130°C and 15 kg per sq cm. An excellent water-resistant decorative board with artistic depth in the surface finish was produced.

Example 5

A solution of methylolurea methyl ether resin was applied onto the printed paper used in Example 1 and dried. Treatment with the solution of diallyl phthalate resin followed by moulding as in Example 1 produced a similar decorative plywood. The product had a good appearance with depth in the surface finish, and was excellently water-resistant.

WHAT WE CLAIM IS:—

1. A process of producing a decorative board which comprises impregnating decorative paper with a thermosetting resin comprising diallyl phthalate prepolymer or a mixture thereof with an unsaturated polyester and a prepolymer with an aldehyde of melamine, benzoguanamine, acetoguanamine, urea or polymethylol acrylamide for improving the affinity between the paper and the resin, and hot pressing the impregnated paper onto a board.

2. A process according to claim 1 in which a piece of white titanium paper impregnated with diallyl phthalate resin is placed between the impregnated decorated paper and the board before hot pressing.

Example 1

55 g per sq m paper was made by a Fourdrinier machine from bleached kraft pulp to which a yellow colouring material has been added. A design of the grain of teak-wood board was gravured on this paper. A solution of polymethylolacrylamide, prepared by dissolving the resin in a mixed solvent (water: acetone=1:3) so as to give a concentration of 15%, was applied onto the paper in an amount such that 20 g per sq m solid material was added, and dried. The paper obtained was impregnated with a resin solution consisting of 60 parts of diallyl phthalate prepolymer, 40 parts of unsaturated polyester, 3 parts of benzoyl peroxide, 0.3 part of internal mould releasing agent, 75 parts of acetone, and 25 parts of toluene until 57% resin pick up, and dried. The resulting dry sheet was laid on a veneer board 4 mm thick and hot pressed for 8 minutes at 130°C and 15 kg per sq cm. A decorative veneer board having artistic depth in the surface finish was produced.

The decorative board was tested for the water-resistance by the following method: A few drops of water were dropped on the surface and allowed to stand for 1 hour under a watch glass. Upon removal of the watch glass, observation of the surface of the decorative board revealed no whitening.

Example 2

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Example 4

Prepolymer of methylolacetoguanamine methyl ether resin was applied onto the printed paper used in Example 2 and dried. The amount of solid material added to the paper was 25 g per sq m. The resulting paper was impregnated with a resin solution consisting of diallyl phthalate prepolymer 60 parts, unsaturated polyester 40 parts, benzoyl peroxide 3 parts, internal mould release agent 0.5 part, acetone 75 parts, and toluene 25 parts and dried to form a sheet with a resin content of 50%. This sheet was laid on an aluminium sheet 2 mm thick with a coating of epoxy resin and hot pressed for 8 minutes at 130°C and 15 kg per sq cm. An excellent water-resistant decorative board with artistic depth in the surface finish was produced.

Example 5

A solution of methylolurea methyl ether resin was applied onto the printed paper used in Example 1 and dried. Treatment with the solution of diallyl phthalate resin followed by moulding as in Example 1 produced a similar decorative plywood. The product had a good appearance with depth in the surface finish, and was excellently water-resistant.

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2. A process according to claim 1 in which a piece of white titanium paper impregnated with diallyl phthalate resin is placed between the impregnated decorated paper and the board before hot pressing.



* C L M S *

3. A process of producing a decorative board as described in any of the Examples.

4. A decorative board produced by a process according to any of the preceding claims.

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