Feb. 19, 1963 M. G. McBRIDE 3,078,176

DECORATIVE SHEET ARTICLE

Filed April 20, 1959

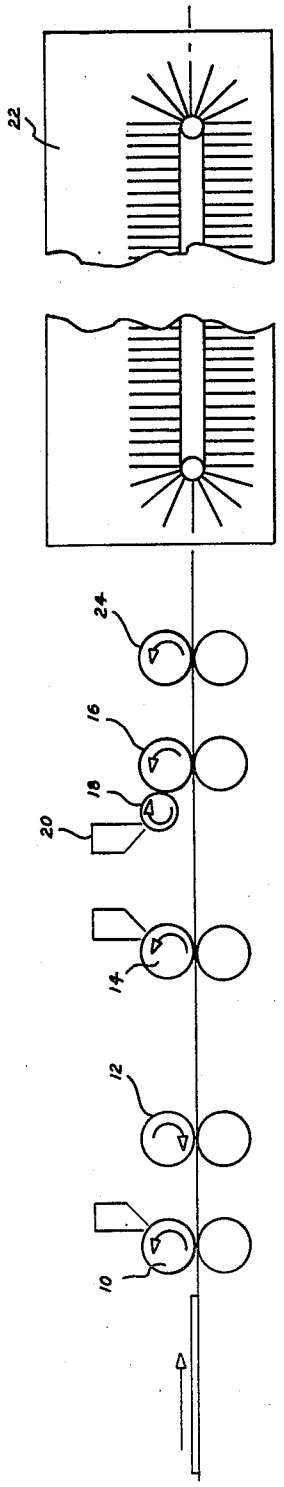


FIG-1

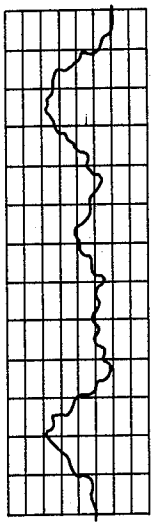


FIG-3

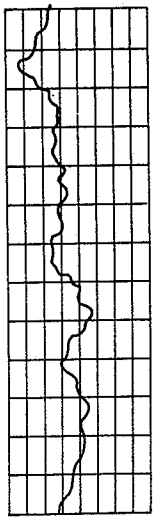


FIG-2

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3,078,176

Patented Feb. 19, 1963

3,078,176

DECORATIVE SHEET ARTICLE

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Filed Apr. 20, 1959, Ser. No. 807,461
5 Claims. (Cl. 117—10)

The present invention relates to the production of decorative wall panels. More particularly, the invention relates to decorative wall panels comprising flat sheet articles, such as hardboard and the like sheet articles, the exposed surfaces of which present the appearance and texture of natural wood veneer. The invention includes the novel texture grained articles themselves and the method of their manufacture.

Heretofore the art has offered to the building industry numerous panels having a simulated wood grain appearance. The panels have usually consisted of metal sheets, insulation boards, wall boards, and the like flat sheet articles whose exposed surfaces have been treated to present a wood grain appearance. The manner of treating the sheet surfaces has included printing of the wood grain design thereon, applying a printed paper sheet overlay thereto, as well as other similar means. None of the prior art articles, however, has ever enjoyed a high degree of commercial success inasmuch as, even to the casual observer, they have all presented the appearance of imitation, rather than natural, wood veneer.

It is a primary object of this invention to provide decorative wall panels characterized by exposed surfaces having both the appearance and texture of natural wood grain.

A further object of the invention resides in the novel method of producing wall panels having the natural appearance and texture of wood veneer.

Other objects of the invention will become apparent from the following detailed description which will be given with particular reference to the drawing in which FIG. 1 is a diagrammatic presentation of the means employed in carrying out the novel method, and FIG. 2 and FIG. 3 are greatly magnified profile charts of the textured surfaces of typical examples of the novel decorative sheets of the invention.

Briefly, the novel method comprises applying a relatively thick first film of coating agent to the surface of the selected sheet material, such as a lignocellulose hardboard, to completely fill the depressions normally present therein. The coating agent is then substantially completely removed from the elevated portions of the sheet surface while that portion of agent residing in the depressed surface areas remains with the result that the sheet surface is smoothed considerably. Thereafter, a second film of coating agent is applied to the sheet surface in a manner to be hereinafter described with particularity inasmuch as this second film imparts the desired texture to the finished article. Then the sheet surface is lithographed with the selected wood grain design and the composite coating films are cured to their final hard condition.

In carrying out the novel method, the sheet material is first coated and wiped with the rolls 10 and 12, respectively, which together comprise a particularly suitable coating apparatus disclosed in U.S. Patent No. 2,642,030 to E. H. Brink. The applicator roll 10 has a circumferentially grooved surface which applies an excess of the coating agent, i.e. paint. The wiping roll 12, which revolves in a direction reverse to the sheet travel, removes the excess paint from the sheet and smooths the ridges in the paint caused by the applicator roll 10. The wiping roll 12 applies a wedging action on the paint which forces it into and fills up the pits and valleys on the sheet surface and, at the same time, leaves the high spots (ridges and cockles) relatively bare of paint.

The coated sheet is next passed beneath the coating roll 14 which revolves in the direction of sheet travel and is therefore called a direct roll applicator. The roll 14 applies the coating agent to the sheet surface in a somewhat beaded manner which is termed a ropy texture. Herein resides a critical feature of the novel method. This second film of coating agent must be so controlled as to provide a texture which may be seen and felt but which is not so coarse as to be undesirable in the finished product. It has been found that the paint must have a viscosity corresponding to a range of about 60–110 Krebs units at the time of its application. Within this range of viscosity, the paint is correctly applied at all conventional coating machine speeds and ambient temperatures. The viscosity of any given coating material is determined with a Stormer viscosimeter employing the conventional Krebs Stormer chart.

The coated sheet is then passed beneath the direct printing roll 16 which applies the selected wood grain design to the surface of the second film of paint. Although shown only diagrammatically, desirably the roll 16 may be an element of an offset gravure printing apparatus. The actual design is etched in the surface of the steel roll 18 which applies ink from the supply trough 20 to roll 16 which, in turn, applies the design to the sheet. Thereafter, the coated and printed sheet is traveled for a distance sufficient to allow the paint to cure to a tack-free condition before handling. A convenient manner of carrying out this treatment is by passing the coated sheet through a wicket conveyer 22. Where desired, a top coat of lacquer may be applied to the printed sheet by means of another direct roll applicator 24 to eliminate the necessity for employing slip sheets between the finished sheets as they are stacked.

As hereinbefore stated, the operable viscosity of the coating composition lies within the range of about 60–110 Krebs units, a conventional type of viscosity measurement. Additionally, the types of paints which are suitable are those which are relatively fast drying and which do not possess extreme flow characteristics. Typical of such materials are the alkyd enamels, polyvinyl alcohol emulsions, water emulsion paints, and various lacquers. The viscosity of these coating agents is controllable by varying the ratio of pigment to vehicle, and by varying the solvent according to the particular conditions of the coating procedure such as machine speed, time lapse between coating stations, drying time and temperature and the like. Conventional solvents are usually employed such as xylene, toluene, alcohol, and the like. In the case of emulsion type agents, stability as regards texture formation may be regulated by the use of various thixotropic agents.

The most critical feature involved in producing the desired texture resides in so controlling the above described paint characteristics as to obtain a desirable roping effect when the second coating film is applied and thereafter maintaining this effect until the printing step has been carried out and the films have cured. It has been found that a completely acceptable texture is obtained when the elevation or amplitude of the individual beads of the ropy texture lies within the range of about 150–2,000 micro-inches. Elevations, or deviation from smoothness, in excess of 2,000 micro-inches result in a texture which is too coarse in appearance and which causes blurring of the ink in the lithographed design. To the contrary, where the coating consists principally of beads or ridges which are less than about 150 micro-inches in height, the finished panel is smooth in appearance and presents no visible texture. In measuring the texture it has been found that a device known as a Microcorder provides a suitable magnified profile chart of the sheet surface. The machine is manufactured by the Micrometrical

Manufacturing Co. and employs a recording stylus which traces the surface texture, accurately presenting the profile thereof as a greatly magnified linear chart. FIGS. 2 and 3 are illustrative, respectively, of portions of the so-produced surface profile charts of representative fine and coarse commercially acceptable textured surfaces in which the vertical gradations of the charts are 250 micro-inches each and the horizontal gradations are 0.01 inch each. In evaluating the novel textured surface it has been found that, within the above described critical limits, the surface should have a mean peak to peak amplitude within the range of about 200–850 micro-inches. The mean period, or occurrence, of the peaks should lie within the range of about 0.05–0.07 inch. Within these ranges of averages, an especially desirable surface texture is provided.

In the foregoing description of the novel method the application of the first film of coating material has been effected by a particularly suitable reverse roll coating apparatus. Bearing in mind, however, the fact that the purpose of the first film is to fill the depressions of the sheet so as to present an essentially smooth surface, it will be appreciated that other conventional coating machinery may be employed in this step of the method. For example, a knife coater or the like apparatus may be employed. The essential feature resides in removing substantially all of the coating material from the raised portions of the sheet so as to present as smooth a surface as possible. Thereafter, the second film of coating material is to be applied with a direct roll coating apparatus. Controlling the viscosity of the coating material within the above described limits results in the formation of a plurality of essentially parallel beady ridges across the surface of the coated sheet. Subsequent to the step of lithographing the sheet, the finished article presents the appearance and texture of natural wood.

It will therefore be seen that the novel method provides a simple and economical means of producing coated sheet articles having the pleasing appearance and texture of natural wood. The novel method enables the manufacture of decorative sheet articles which have not heretofore been obtainable commercially. Accordingly, the novel method represents a distinct advance in the art.

I claim:

1. A method of coating a sheet of uneven surface material so as to produce thereon a textured simulated wood grain appearance which consists in the steps of applying a relatively thick first film of coating material to said uneven surface, removing the coating material substantially completely from portions of the surface while maintaining a predetermined amount of coating material on other portions of the surface, thereafter applying to said sheet surface a second film of coating material by means of a direct roll applicator, said second coating material having a viscosity within the range of about 60–110 Krebs units, and then imprinting on the film of coating material a simulated wood grain pattern.

2. A method of coating a sheet of uneven surface material so as to produce thereon a textured simulated wood grain appearance which consists in the steps of applying a relatively thick first film of coating material to said uneven surface, removing the coating material substantially completely from portions of the surface while maintaining a predetermined amount of coating material on other portions of the surface, thereafter applying to said sheet surface a second film of coating material by means of a direct roll applicator, said second coating material having a viscosity within the range of about 60–110 Krebs units, and then imprinting on the film of coating material a simulated wood grain pattern, said second film of coating material having a ropy texture the individual elevations of which lie within the range of about 150–2,000 micro-inches.

3. In the method of coating a sheet of uneven surface material, the steps consisting of applying a relatively thick first film of coating material to said uneven surface, removing the coating material substantially completely from portions of the surface while maintaining a predetermined amount of coating material on other portions of the surface, and then applying to said sheet surface a second film of similar coating material by means of a direct roll applicator, said second coating material having a viscosity within the range of about 60–110 Krebs units, whereby there is imparted to said second film of coating material a fine textured appearance wherein the mean amplitude of the texture lies within the range of about 200–850 micro-inches.

4. A decorative sheet material characterized by a textured simulated wood grain appearance comprising a sheet material having on one of its surfaces a first film of coating material, said film being relatively thick at depressed portions of said sheet surface and relatively thin at elevated areas of said sheet surface, a second film of coating material overlying said first film, said second film containing a plurality of essentially parallel beady ridges, said ridges having an amplitude within the range of about 150–2,000 micro-inches and a mean period of about 0.05–0.07 inch, and an overlying film of ink in the form of a simulated wood grain pattern.

5. A decorative sheet material characterized by a textured simulated wood grain appearance comprising a sheet material having on one of its surfaces a first film of coating material, said film being relatively thick at depressed portions of said sheet surface and relatively thin at elevated areas of said sheet surface, a second film of coating material overlying said first film, said second film containing a plurality of essentially parallel beady ridges, said ridges having a mean amplitude within the range of about 200–850 micro-inches and a mean period of about 0.05–0.07 inch, and an overlying film of ink in the form of a simulated wood grain pattern.

References Cited in the file of this patent

UNITED STATES PATENTS

647,833	Henricus	Apr. 17, 1900
1,008,296	Smith	Nov. 7, 1911
2,035,761	Reese	Mar. 31, 1936
2,069,228	Eichstadt	Feb. 2, 1937
2,642,030	Brink	June 16, 1953
2,971,856	Lauring	Feb. 14, 1961

OTHER REFERENCES

Van Fischer, "Paint and Varnish Technology," page 299, Reinhold Publishing Corp., New York (1948).