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IDENTIFIABLE CARTON BOARD

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3 Sheets-Sheet 1

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Coated paper board is used extensively for cartons or merchandise containers. It is desirable that the paper board for the cartons of any individual carton user or merchandise distributor should be made with an identifying marking or characteristic which cannot be reproduced except in the process of manufacturing the paper board from the wet stock, and by reference to which the genuineness of such cartons can be determined, independently of the labels and advertising matter printed or lithographed on the exterior faces of the cartons, so as to present an obstacle to successful counterfeiting of the cartons. Paper board having such identifying marking or characteristic may for convenience be referred to as identifiable carton board.

The present invention (for which this application is filed as a continuation of my application filed April 28, 1934, Serial No. 722,862) embraces a novel product of the character indicated, and a method and means for producing the same. The invention will be best understood by reference to an illustrative sample of identifiable carton board embodying the invention, and by reference to an illustrative machine for use in practicing the invention, which sample and machine are shown in the accompanying drawings.

In said drawings:

Fig. 1 is a front view of a fragment of the illustrative product, showing the same mutilated in such manner as to expose different paper laminations of which the paper board is composed.

Fig. 2 is a back view of said fragment, also showing the same mutilated to expose different paper laminations.

Fig. 3 diagrammatically represents a magnified section of the product, the section being taken on the line 3-3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a diagrammatic view of the illustrative machine, this being a machine for making the wet paper board sheet in condition to be delivered for pressing and ensuing operations.

Fig. 5 is a plan view of a color applying means embodied in the illustrative machine.

Fig. 6 is a side elevation partly in section of a portion of the illustrative machine comprising two cylinder molds or forming cylinders and intermediate color applying mechanism.

The illustrative product comprises coated paper board having a concealed or obscured identifying characteristic provided by artificially and distinctively colored portions of an inside layer of the paper board, and also in this instance having additional identifying marks hereafter referred to.

In Figs. 1 to 3, the several paper plies or laminations of which the sheet of paper board is composed are designated by the numerals 1 to 5.

Ordinarily the paper board is made from cheap or coarse stock surfaced or lined with relatively finer stock. For example the inside layers 2, 3, 4 may be made from newspaper stock obtained from old newspapers or the like, while the outside layers or front and back liners 1 and 5 may be of white sulphite or manila stock. The front liner 5 is coated as indicated at 6 with a coat of clay coating material or the like, providing a surface on which is adapted to be printed or lithographed the labels and printed matter to appear on the exterior faces of the cartons.

In the illustrative product, the paper layer 3 is shown having artificially colored portions 1 of one distinctive color, in this instance red, and artificially colored portions 8 of another distinctive color, in this instance blue, the particular arrangement being such as to provide a multiplicity of colored streaks of contrasting colors in the interior of the paper board, the presence of which may be detected by examining an edge of the board cut transversely of the streaks or by muting such edge to expose the colored layer.

Additional identifying criteria are embodied in the illustrative product by identifying marks 8 printed in this instance on the front liner under and masked by the opaque layer of white or light colored clay coating material, and by other identifying marks 10 printed in this instance on the inside of the back liner of the paper board, which identifying marks may be private brands, trade-marks or other designs of an individual carton user. The identifying marks 8 may be wholly or partially concealed by the superposed clay coating material but adapted to be rendered visible or more clearly visible by wetting the coated side of the board. Thus in Fig. 1 some of the identifying marks 8 are rendered apparent by wetting a portion of the coated side of the board as indicated at 9a. The identifying marks 10 may be printed on any of the inside layers of the board so as to be either wholly or partly concealed, depending upon the darkness of the fluid with which they are printed and the thickness of the paper material which intervenes between them and the surface of the board from which they are to be seen and the light permeability of such paper material. In this instance the said identifying marks 10 being printed in 85
dark ink on the inside of the back liner of the board are normally visible through said layer or from the back side of the board, as indicated in Fig. 2. Thus the specific product illustrated is characterized by identifying marks which are normally apparent at the back side of the paper board, other normally concealed or nearly concealed identifying marks which are adapted to be rendered apparent by moistening or wetting the front side of the board, and a further concealed or obscured identifying marking embodied in the interior of the board, the presence of which would not ordinarily be suspected but which may be detected by inspectors.

The illustrative machine for making the wet paper board sheet which is shown in Figs. 4 to 6 comprises a series of cylinder molds or forming cylinders 11, 12, 13, 14 and 15. Each cylinder mold revolves in a vat to which a properly prepared pulp solution is supplied by any suitable arrangement for feeding the liquid stock. As well understood in the art, the pulp in each vat is strained by the cylinder mold, the water flowing off through the cylindrical screen surface of the mold and the pulp fibers gathering thereon, so that each cylinder mold as it revolves accumulates a layer or film of pulp fibers. The cylinder molds are driven by the endless press felt 17, the lower run of the press felt being in operative engagement with the top surfaces of the cylinders, and each cylinder mold having associated therewith a color applying roll 18 which bears with appropriate pressure on the cylinder mold, the felt being clamped between the couch rolls and cylinder molds. By virtue of the pressure exerted by the couch rolls, the pulp layers formed on the cylinder molds are couched or transferred to the felt, the first layer formed on the first cylinder being applied directly to the felt, the next layer formed on the second cylinder being deposited on the first layer, and so on. The laminated wet web which forms on the felt is carried by said felt and a coating top felt 19 between a series of presses or squeeze rolls 20 which squeeze out the surplus water from the web and reduce it to a compacted state, with its several laminations thoroughly bonded together. The wet sheet thus made is passed through the press 21 and may be subjected to further pressing operations, after which the sheet is dried, calendered, coated on its front side with clay coating material or the like and supercalendered for finishing its coated surface. The operations subsequent to the formation of the paper board sheet are well known and will not be described here.

In the wet state the pulp layers may be for example in accordance with the Colbert and Preston Patents Nos. 1,514,439 of November 4, 1924 and 1,903,325 of April 4, 1933.

The pulp layers formed respectively on the cylinders 11, 12, 13, 14 and 15 of the illustrative machine correspond to the layers 1, 2, 3, 4 and 5 of the illustrative product, the back liner of the paper board being formed on the cylinder 11 and the front liner on the cylinder 15.

For marking the paper board with an identifying marking in contrasting colors embodied in an inside layer, as typified by the red and blue streaks embodied in the illustrative product, I provide for coloring the selected portions of the selected layer as required during the process of making the wet sheet of paper board. Means for this purpose are represented in the illustrative machine by the rotating color applying rolls 22 and 23, which in this instance are shown arranged between the cylinder molds 13 and 14, so as to engage the wet web on the felt after it has received the layer formed on the cylinder 13, such layer being that which corresponds to the multicolored layer 3 of the illustrative product. Each color applying roll has a surface configuration to engage the portions of the paper layer which are to receive a particular color. Thus as the pulp layer engaged by the cylinder is to be colored in alternately blue and red streaks, the color applying rolls have color applying surfaces which are provided by annular ribs 22a and 23a (Fig. 5), the ribs of the one roller being staggered in relation to those of the other roller. It will be understood that one roller applies one color to the pulp layer engaged thereby, and the other roller applies the other color.

The color solution supplied to each color applying roll may be an aqueous solution of dye stuff or coloring matter such as is commonly employed for coloring paper stock in the beaters. Suitable color solutions may be prepared by dissolving in hot water ordinary aniline color powders in the proportions of about nine or ten pounds of powder to 240 pounds of water. For example I prepare a blue color solution by dissolving 9 lbs. of Methylene Blue BB in 240 lbs. of hot water, and a red color solution by dissolving 10¼ lbs. of Safranine C. F. extra in 240 lbs. of hot water. It will be understood that these color solutions and stated proportions are illustrative and that I do not desire to be restricted in this regard.

In the illustrative machine, each color applying roll 22 and 23 has its lower part dipping in a bath of color solution, the two color solutions being restrictedly contained in the receptacles 24 and 25, whereby each color applying surface of each roll will transfer a film of the color solution to the pulp layer with which the roll contacts. Associated with the color applying rolls and offset therefrom are vertically adjustable guide rolls 26 and 27 which hold down the felt and material carried thereby with appropriate pressure to insure the transfer of the color solutions to the pulp layer. The two color receptacles 24 and 25 may be divisions of a single tank in which the bearings of the color applying rolls are mounted, and this entire color applying unit may be mounted in the machine for vertical adjustments, so that, in conjunction with adjustment of the guide rolls 26 and 27, just the desired color may be obtained.

As shown in Figs. 5 and 6, the roll 22 may be driven by a belt 28 from a pulley 29 on the shaft of the couch roll associated with the next forming cylinder, said belt engaging a pulley 30 on the shaft of the roll 21 which drives the roll 23 through the gears 31, 32. The color applying rolls should be driven to rotate at the same surface speed as the felt and material carried thereby.

With the use of color solutions or liquid dyes of the type indicated, applied as indicated, the portions of the pulp layer in contact with the color applying surfaces of the color applying rolls will take up the colors very effectively, so that such portions of the pulp layer will be dyed substantially for the full thickness of the layer, and the color may even penetrate somewhat into the next layer, for which reason it is desirable that the pulp layer to which the colors are applied should be non-adjacent to the white front liner of the board which is to receive the white or light colored clay coating. Also, the pulp layer formed on the next cylinder of the machine and imposed on the colored layer may receive some of the color. Thus
the colored streaks or other design embodied in the paper board will be fairly deep, so that it may be rendered apparent by stripping the paper material from either side of the colored layer.

On the other hand, the color is applied without objectionable running, so that the lines of the applied design are fairly clean cut.

The practice described involves practically the dyeing of certain portions of an intermediate layer or ply of the paper board by carrying the wet ply into contact with surfaces bearing films of dye which are absorbed in the ply for substantially its full thickness.

The identifying marks 10 printed on the inside of the back layer of the illustrative product are printed therein during the making of the wet board sheet by the process and means in accordance with the disclosure of the accompanying application of Colbert, Daly and Preston Serial No. 712,346, issued as Patent No. 2,019,845 of November 5, 1938. The means for this purpose, as shown in Fig. 3, comprises a printing roll 34 driven in the same manner as the previously mentioned color applying rolls and to which a suitable printing liquid, which may comprise a clay solution of about the consistency of cream and containing lamp black or dark aniline dye, is applied by the roll 35 rotating in contact therewith, said roll having its lower part submerged in a bath of said printing liquid contained in the receptacle 36.

The identifying marks 3 on the front liner of the illustrative product may be printed thereon with waterproof printer's ink after the board has been made and before application of the coating material to its front side.

It will be understood that the illustrative practice herein described may be variously modified with respect to the number of layers or laminations of the paper board, the selected ply to be colored, the colors therefor, and with respect to the additional identifying marks.

Among other advantages, the present invention provides paper board with an identifying marking consisting of a multicolored interior portion of the board, giving not only the same advantageous effect as if different layers of the board were made from stock of contrasting distinctive colors, but also the better effect of a distinctive design; and these effects are obtained by coloring only portions of the same layer, with the consequence that much less dye liquid is required than if the whole of one or more layers were colored, and furthermore this type of multicolor marking can be embodied successfully in paper board thinner or composed of a less number of plies than would be practicable for a multicolor marking produced by two distinctively colored plies.

What I claim as my invention, and desire to secure by Letters Patent, is:

As a new article of manufacture, the product comprising multi-ply paper board having its layers bonded by inter-tellied fibers and including between its front and back layers a layer artificially colored, for its full thickness and in different colors in different portions thereof, by dyes of different colors absorbed in the material of said layer throughout the thickness thereof, said portions being narrow, elongated, closely spaced, artificially colored portions regularly distributed throughout the area of such layer and in alternating colors sharply contrasting with each other and with the intervening portions of such layer and the layers adjacent thereto, said intervening portions and adjacent layers being of natural stock color, there being a sufficient thickness of the paper board at each side of said artificially colored layer to conceal the colored design and colors thereof, and the board being coated on its front side with clay coating material providing an opaque surface adapted to be printed upon.

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