Feb. 16, 1932. J. F. WALSH ET AL 1,845,457

COLORING THERMOPLASTIC MATERIAL

Filed Nov. 24, 1928

Fig. 1.

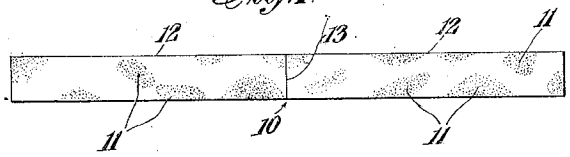


Fig. 2.

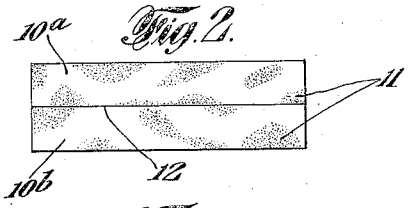


Fig. 3.

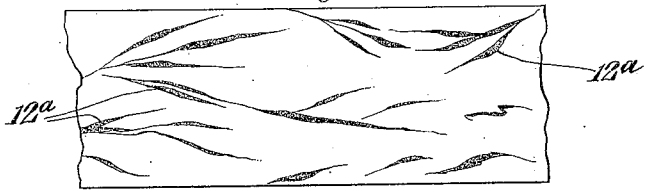
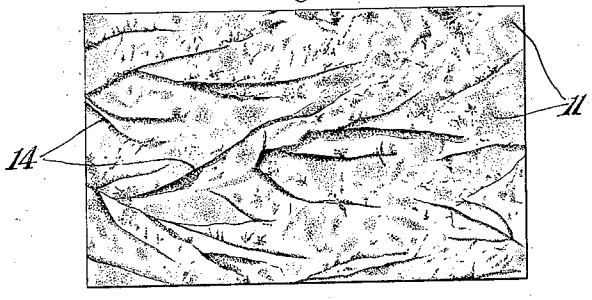


Fig. 4.



INVENTORS.
James F. Walsh + William Bowker
BY
Edwards, Sager + Bowen
ATTORNEYS.

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UNITED STATES PATENT OFFICE

JAMES F. WALSH, OF EAST ORANGE, AND WILLIAM BOWKER, OF NEWARK, NEW JERSEY, ASSIGNORS TO CELLULOID CORPORATION, A CORPORATION OF NEW JERSEY

COLORING THERMOPLASTIC MATERIAL

Application filed November 24, 1928. Serial No. 321,596.

Our invention relates to coloration of thermo-plastic material, such as pyroxylin plastics and, generally stated, has for its objects the provision of means for obtaining a novel effect in such coloration and the product resulting from the employment of such means. More specifically, the invention aims to produce an optical effect in imitation of the discontinuous transparency of cracked ice resulting from manifold fractures within the mass.

To the above and other ends which will subsequently appear, our invention resides in the features hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings,

Fig. 1 is a side elevation of a sheet of celluloid at one stage or step in our novel process;

Fig. 2 is a side elevation of the sheet at a second or advanced stage; and

Figs. 3 and 4 are respectively fragmentary sectional and plan views illustrating certain of the results obtained by the invention.

In carrying out the invention, in order to obtain the desired results, it is preferred to make the material in two parts, one quite transparent, the other slightly clouded, and to blend them incompletely in suitable proportions by any suitable means, such as the usual mixing rolls. The object of this particoloring or incomplete blending is to create a basic coloration or configuration of lively appearance in itself.

The roll-made sheet so produced is then painted on one side with a compatible colloidal suspension of suitable pigment, say zinc oxide for whitish effects, or pearl essence when an iridescent mineral is to be copied. This layer of pigmentation is then distributed irregularly or interruptedly throughout the mass, as by passing the rough sheets through corrugated rolls, in a way to avoid complete mixing while producing the necessary agglomeration of broken parts. This is best accomplished by placing the painted surface against the unpainted surface of another sheet, thus forming a double sheet with the color layer inside, which double sheet is then subjected to the corrugated roll action.

At this point the plain calender rolls are also brought into action, the plan being not only to break the painted sheets, preferably doubled as described, into small sections but also to roll out the resultant mass into fairly smooth layers of about one-half inch thickness to be subsequently amalgamated into blocks for planing or final sheet formation.

To complete the shatter-crack or cracked ice effect, however, we introduce a middle step into the process, that of a positive sectional formation to approximate more closely the discontinuous fracture-like structural pattern or appearance which it is desired to reproduce. This middle step consists of making numerous irregular cuts or separations in the rolled sheet, each cut representing a crack in an ice mass which is produced therein by rupture. These cuts in the rough-rolled sheet are then made of permanent appearance by painting with the pigmented colloid vehicle (preferably a collodion) used in the first step of the color preparation.

The whole mass of rolled sheets of variegated internal coloration broken by incisions surfaced with pigmented varnish is now solidified, as in the usual block press by means of heat and pressure, and after solidification may be sliced into sections of demanded thickness or cut into rods of any desired gauge.

Various stages in the above described process are illustrated in the drawings. Thus Fig. 1 shows in side elevation a sheet 10 of thermoplastic material as it comes from the mixing rolls. This sheet, as stated, is made of two kinds of material, one transparent and one slightly clouded so as to create a lively basic coloration. The shaded portions 11 are intended to represent the clouded portions as distributed through the mass or sheet.

One surface, as the top surface 12 of sheet 10, is painted with the desired pigment, such as zinc oxide, and the sheet is then divided as indicated as 13, making two sections, 10^a and 10^b.

Said sections 10^a and 10^b are then placed with their painted surfaces 12 in contact as

illustrated in Fig. 2, and are passed through the corrugated rolls.

Fig. 3 illustrates the sheet after the corrugated roll action thereon, the marks 12ª representing the painted surface 12 broken up and irregularly distributed through the mass. In order to avoid confusion, the shading 11, representing the clouded portions in Figs. 1 and 2, has been omitted in Fig. 3.

In Fig. 4 is illustrated a fragmentary plan view showing cuts 14 in the mottled, corrugated, rolled sheet, these cuts or lines being painted, as described, to suggest cracks in ice. In Fig. 4 the shaded portions 11 and the marks 12ª resulting from the corrugated roll action are omitted to promote clarity in the "cracked ice", so called, showing.

By following the described process, it is possible to obtain attractive patterns based on the cracked-ice appearance and capable of variable color effects and details of design.

To make a contrasting color in the fracture a colored pigment may be substituted for the white pigment, or a soluble color or dye applied in solution form over the white pigment or any portion thereof to produce a white or any number of colored effects in fractures or portions of same, the functioning of white pigment being to give a greater solidity to the color effect.

Any suitable formulæ for the thermoplastic material and the colloidal agent for the pigment may be employed in carrying out the invention. It is to be noted, however, that the process employs pigments, as distinguished from dyes which would dissolve in the celluloidal mass or colloidal solution.

The invention comprehends the production of cracked-ice effects (or similar internally broken structure in a transparent plastic) even though colored in a way that only suggests cracked-ice in shattered-like structure; for though ice is colored only by accident, its usual colorless appearance may be varied from by design and without departing from the principle of the invention.

The term thermoplastic material as used herein means any composition having a transparent plastic base whether formed of pyroxylin, cellulose acetate, or other colloid which produces a solid transparent mass subject to coloration and manipulation in imitation of natural substances or patterns. We have operated successfully with a compound of pyroxylin. While preferably a rolled sheet is used for surface painting, one that is produced by slicing from a block or made by any other suitable method may be employed.

What we claim is:—

1. The method of producing optical effects in a substantially transparent plastic composition, which consists in pigmentizing the surface of a sheet, breaking up or corrugating the sheet, smoothing the mass into sheets, cutting or incising such sheets to produce fresh surfaces, painting said fresh surfaces, and, finally, solidifying the whole into forms suitable for fabrication.

2. The method of producing optical effects in a substantially transparent plastic composition having a cellulosic derivative base, which consists in pigmentizing the surface of a sheet of such composition, breaking up or corrugating the sheet, smoothing the mass into sheets of coherent structure, cutting or incising such sheets to produce fresh surfaces, painting said fresh surfaces with pigment, and, finally, solidifying the whole into forms suitable for fabrication.

3. The method of producing optical effects in a substantially transparent plastic composition having a pyroxylin base, which consists in pigmentizing the surface of a sheet of such composition, breaking up or corrugating the sheet, smoothing the mass into sheets of coherent structure, cutting or incising such sheets to produce fresh surfaces, painting said fresh surfaces with pigment, and, finally, solidifying the whole into forms suitable for fabrication.

4. The method of producing cracked ice effects in a substantially transparent plastic composition, which comprises pigmentizing the surface of a rolled sheet, breaking up or corrugating the same, smoothing the resultant mass into sheets, cutting or incising such sheets to produce fresh surfaces, painting the said surfaces with pigment, and then solidifying the whole into blocks suitable for separation into sheets or rods.

5. The method of producing cracked ice effects in a substantially transparent pyroxylin composition, which comprises pigmentizing the surface of a rolled sheet, breaking up or corrugating the same, smoothing the resultant mass into sheets, cutting or incising such sheets to produce fresh surfaces, painting the said surfaces with pigment, and then solidifying the whole into blocks suitable for separation into sheets or rods.

6. The method of producing a discontinuous fracture-like pattern in a substantially transparent plastic composition, which consists in separating the mass into parts, pigmentizing the resultant surfaces to correspond with fractures in transparent natural substances of like appearance, solidifying into a whole, incising the same at predetermined portions, applying a pigment to such incisions, working up the mass on the rolls and separating the resultant solid into suitable parts.

7. The production of a discontinuous fracture-like pattern in a substantially transparent, parti-colored plastic composition having a cellulosic derivative base by cutting, breaking or otherwise forming the mass into multi-sectional parts, applying a pigment to the newly made resultant surfaces

to correspond with shatter-cracks or separations in ice or like transparent natural substances, solidifying the whole into a block or equivalent form, and cutting parts from said form.

8. A substantially transparent composition of a cellulose derivative base having pigments of contrasting color incorporated therein and presenting discontinuous shatter-crack and flocculent effects.

9. A substantially transparent composition of a cellulose derivative base having opaque pigments of contrasting color incorporated therein and presenting discontinuous shatter-crack and flocculated effects.

10. A substantially transparent composition of a cellulose derivative base having white mottled effects having discontinuous cracks containing opaque pigments presenting shatter-crack effects.

JAMES F. WALSH.
WILLIAM BOWKER.