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METHOD OF FROSTING LUCITE

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The invention in general relates to a method of treating a body of a transparent thermoplastic material such as a polymerized derivative of methacrylic acid commonly known as "Lucite," for the purpose of creating a frost or white coating on the surface thereof, and the invention also relates to the resulting product. The invention, in one specific situation, relates to the production of readily erased sign characters on a surface of "Lucite" or similar plastic material.

The primary object of the invention is to provide an improved technique for producing a milky white or frost-like white coating on the surface of a body of "Lucite" for decorative purposes, for sign producing and for manufacturing motion picture screens, and for use in other arts, where it is desired to create either a solid continuous surface showing, or a design or letter on an otherwise transparent sheet or bar of "Lucite," or equivalent thermoplastic material.

Another object of the invention is to produce a sign character, ornamental sheet, or bar, composed entirely of "Lucite" or equivalent transparent plastic material, the body portion of which has the usual transparent characteristics of "Lucite" or equivalent, but the surface or pre-intended areas thereof, shall visually disclose a frosting or milky-coat appearance distinguishing from the balance of the transparent body.

Various other objects and advantages of the invention will be in part obvious from a consideration of the method features of the disclosure and in part will be more fully set forth in the following particular description of one method of practicing the invention, and the invention also consists in certain new and novel modifications of the preferred method hereinafter set forth and claimed.

One method which has proven highly satisfactory in attaining the above objectives has been to clean a surface of the polymerized derivative of methacrylic acid in the form now known as "Lucite" so as to render the surface to be treated free of grease. This "Lucite" may be of the clear glass-like type or may be of the tinted color type. This preliminary cleaning may be done by washing with alcohol or any of the presently known grease solvents. The "Lucite" is then heated as by means of a gas flame to a temperature materially higher than room temperature, but lower than the melting temperature of the "Lucite," and preferably until the "Lucite" has a flexibility similar to that of rubber.

While the "Lucite" is still hot, there is applied to the surface under treatment a solution of de-

natured alcohol, such as ethyl alcohol or isopropyl alcohol, or other known solvents of "Lucite." It is suggested that a 70% solution of 180 proof ethyl alcohol is most satisfactory. The alcohol is applied either by spraying, dipping, or, pouring the alcohol onto the surface. The surface so wetted with the alcohol is promptly subjected, while still hot, to a blast of air or equivalent inert gas with the air preferably at a temperature higher than room temperature but materially lower than the melting temperature of the "Lucite."

As an alternative suggestion, an application of the alcohol or other solvent may be permitted to remain on the surface for a short period of time, of the order of three to ten seconds, before it is burned off in the heat treatment, prior to the final application of the alcohol for the air treatment above described. While the process appears to give the best results when the air is forcefully blown onto the surface under treatment by air under pressure from a blower or compressor, satisfactory results can be produced especially on a small object simply by waving the object back and forth bodily through the air.

The result of this treatment is that there is formed on the surface by the time the surplus solvent has evaporated, an extremely thin coating of a white frosting, the composition of which is, at present, unknown but is presumed to be a reduced product of the "Lucite." This whitish or opal coating does not adhere to the "Lucite" tenaciously but can be removed by an energetic rubbing operation, either with a dry towel or by means of a cloth wetted with the solvent.

While the method as thus described is preferable with "Lucite" as the material acted upon, it is suggested that other transparent thermoplastic materials, such as, an acrylic resin, two forms of which are known commercially as "Plexiglass," and "Crystalite" may be used instead of "Lucite," but the method herein featured operates best when used with "Lucite."

Another suggested method for treating the plastic surface is to soften the surface as hereinbefore suggested and then while soft, to press a fine mesh wire screen into the surface for a few seconds and then to remove the screen before the surface has had an opportunity to cool and harden. There results a frosted, or perhaps more accurately described, a whitish stippled finish on the surface; the degree or density of whiteness depending upon the fineness of the mesh of the screen used. While this method is not as satisfactory as the preferred method above described,

it has the advantage of being a cheaper operation and an operation which can be more quickly performed.

Another suggested method of frosting the surface of the transparent plastic body is to heat the surface until it becomes soft as previously described, and then to apply to the surface so softened and rendered sticky, a layer of finely divided particles, preferably in powdered form, of the "Lucite" or other material of which the surface is formed. This may be done by means of a hot air blast blowing fine particles of the "Lucite," preferably in powdered form, onto the surface as a spray. The use of hot air tends to keep the surface and particles sufficiently soft to permit them to adhere. In either case the particles stick to the surface and as the temperature of the heated surface returns to room temperature, the particles adhere and form the frosted or whitish coating effect similar to that described as the result of following the preferred method first above mentioned.

While warm air has been suggested as the cheapest medium for drying off the solvent from the surface under treatment, it is suggested that any gas, preferably an inert gas, may be used and, preferably any known gas which has capacity to evaporate the alcohol or other volatile solvent of the "Lucite" or equivalent thermoplastic material used.

It is suggested that "Lucite" or any of the other plastics may be utilized as a basis for a sign on which designs, letters, or other sign characters, may be formed and, if desired, removed repeatedly from time to time. One way in which such a sign may be formed is to place a stencil of the desired letter, figure or design, hereinafter referred to as a sign character, on the hot surface of the plastic. Then a solvent, such as the ethyl or isopropyl alcohols mentioned as in the case of the "Lucite," is sprayed through the opening or openings provided by the stencil, and the stencil removed. Finally, the solvent coated stencil is subjected to an action of a blast of dry air until the solvent has completely evaporated. As the result of this procedure, the sign character will be formed on the "Lucite" or similar thermoplastic background as a whitish, frosted or pale opaque showing having the design of the stencil used. When it is desired to display a different form of sign, the old sign characters are erased as by rubbing the same vigorously with a coarse towel, either dry, or, preferably wetted with a solvent of the background material; the surface is again cleaned, if necessary, of any grease or other foreign matters which may have adhered thereto during the prior use, and, by the use of other stencils and a repetition of the method thus described, a different sign may be produced.

It is thus simply necessary to provide a panel of "Lucite" to be used as a blackboard is used at present, and, by following any of the methods above suggested, different sign characters may be formed from time to time on the glass-like panel or board, and the writings erased when desired, leaving the panel in its original condition and appearance ready for the formation thereon of another set of characters.

A flat "Lucite" panel treated by the method first above described, coated evenly across its face with a non-glaring, dense white, light reflecting film, and, presumably formed of a multitude of minute facets of the "Lucite," irregularly and densely associated on the panel, has proven satisfactory in use as a motion picture

screen. The panel is manufactured most economically as a large sheet and then sawed or cut into different sizes required to fill orders for different size "home" screens. As the sheets are flexible they can be easily sprung into mounting frames.

A device frosted by the methods herein suggested has all the appearance of frosted glass, and, in those cases where a colored "Lucite" is used, beautiful colored frosted effects can be produced in contrast to the brilliant, transparent portions not so frosted. Such devices when formed from "Lucite," or equivalent thermoplastic materials, have all the advantages inherent in such materials, such as, ease of molding, a certain degree of flexibility and ease of binding not possible with glass, and which can be readily sawed or cut from stock material to fit in mountings or into any desired shape or size.

I claim:

1. In the art of treating a surface of a body of material composed solely or primarily of a polymerized derivative of methacrylic acid to form thereon a readily erasible coating, the method which consists in applying to said surface a solvent formed of ethyl or isopropyl alcohol to clean the surface, subjecting the surface to the heating action of a flame to burn off the surplus alcohol quickly and to heat the surface to a temperature higher than room temperature but lower than the melting temperature of the material, while still warm again applying said solvent and promptly subjecting the surface to the effect of a blast of air moving rapidly relative to the surface with the air at a temperature higher than room temperature but materially lower than the melting temperature of the material and continuing said air treatment until there appears on the surface a milky or frost-like white coating.

2. In the art of treating a surface of a body of material composed primarily of a polymerized derivative of methacrylic acid, the method which consists in applying to a previously grease cleaned portion of said surface a solvent of said material, permitting the same to remain thereon for a short period of the order of three to ten seconds, subjecting the surface to a flame treatment until the surplus solvent has burned off and the surface heated above room temperature and until it is slightly flexible but below the temperature at which the material melts, applying to said heated surface a solvent of the material and then promptly subjecting the surface to an air blast at a temperature above room temperature but materially below the temperature at which the material melts and continuing such air blast treatment until the surface has turned a milky or frost-like white and any free solvent which may be present has completely disappeared.

3. In the art of treating polymerized derivative of methacrylic acid to change the visual appearance of its surface without permanently effecting the surface, the method which consists in heating the polymerized derivative of methacrylic acid until it is slightly flexible, dipping the hot methacralite into a seventy percent solution of denatured alcohol to coat the surface area to be treated, exposing the area of the polymerized derivative of methacrylic acid so treated to a blast of warm dry air until a white film or frosting appears.

4. In the art of frosting polymerized derivative of methacrylic acid, the method which consists in heating the polymerized derivative of

methacrylic acid, applying denatured alcohol to a surface thereof while hot and exposing the surface so treated to a blast of dry warm air.

5. In the art of frosting polymerized derivative of methacrylic acid, the method which includes the step of causing dry warm air to pass across a hot surface of the polymerized derivative of methacrylic acid which has been previously wetted with a solvent of the methacralite formed of a 70% solution of 180 proof ethyl alcohol.

6. In the art of treating a surface of a body of material including a polymerized derivative of methacrylic acid to form a readily removable frosting thereon, the method which includes the step of causing an inert gas at a temperature higher than room temperature and lower than the melting temperature of the body of material to pass across such surface when the surface is heated at a temperature above room temperature and below the temperature at which the surface melts when said surface is coated with a solution of denatured alcohol.

7. In the art of treating a surface of a body of material containing a polymerized derivative of methacrylic acid, the method which consists in heating the surface, applying ethyl alcohol to the heated surface and blowing the alcohol off the heated surface to leave thereon a white frosting and subsequently rubbing off the white frosting.

8. In the art of temporarily forming designs, letters and like sign characters on the surface of a polymerized derivative of methacrylic acid, the method which consists in applying a stencil of the desired sign character to the surface, spraying the part of the surface exposed through the stencil with a solvent of the said polymerized derivative of methacrylic acid and subjecting the parts so sprayed to the effect of a blast of air until the desired sign characters show with white cloud-like effect on the material and any free alcohol has evaporated and subsequently rubbing the surface with a dry towel.

9. A one-piece body of material formed solely of a polymerized derivative of methacrylic acid and initially all transparent, said body in its interior portions being transparent and having a portion of its surface forming an extremely thin coating of a white frosting distinguishing by its visible whiteness from the balance of the transparent body and which frosting does not adhere tenaciously to the panel but may be rubbed off by means of a cloth wetted with alcohol leaving the panel in its original transparent condition available for use in reforming thereon another frosting whereby the body may be used as is a "blackboard."

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