

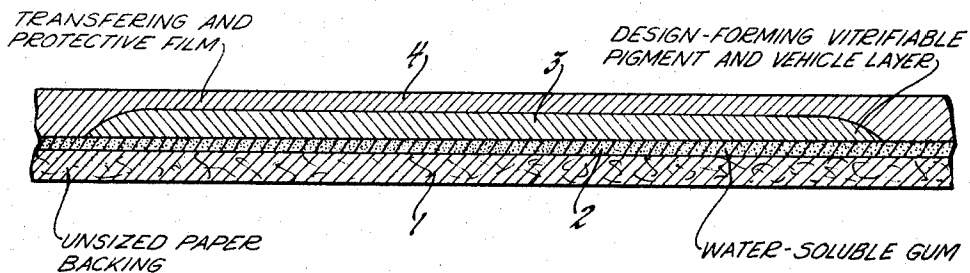
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VITRIFIABLE DECALCOMANIA

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VITRIFIABLE DECALCOMANIA
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This application is a continuation-in-part of my prior application Serial No. 106,486, filed May 1, 1961, now abandoned.

The object of the present invention is to provide an improved vitrifiable decalcomania for transferring decorations or inscriptions onto ceramics, glass, sheet metal, cast metal or any other material which it is desired to furnish with an impression by means of fire and with the aid of a pigment or high-temperature vitrifiable enamel.

The invention is illustrated in the accompanying drawing, in which:

The figure is a diagrammatic sectional view illustrating the invention.

Due to the nature of the improved vitrifiable decalcomania according to the present invention, namely, that the inscription is fixed by firing and thus vitrifying and fusing the pigment to the surface of the object in question, the term pyrography will be employed hereinafter instead of decalcomania, for reasons of better or more appropriate etymology. Consequently, subsequent references to pyrography are to be interpreted as improved vitrifiable decalcomania.

So far, perfection has been difficult to attain in the matter of said vitrifiable inscriptions. Pyrography according to the present invention, however, is a ready means to obtain consistently perfect designs or motifs.

The pyrographic process according to the present invention is exteriorly identical to the manufacture of decalcomania of the vitrifiable variety which is of public domain, i.e., comprising the application of a layer of water-soluble gum over an unsized paper base and, once said layer has dried, impressing thereon the motif to be transferred. Once the impression has dried, a water-insoluble film is extended over same and over the layer of hydrosoluble gum. The aforesaid film can also be applied before impression, i.e., over the water-soluble gum.

When the moment for making the transfer has arrived, the paper is submerged in water which, on being absorbed, brings about dissolution of the hydrosoluble gum, thus freeing the impression and the film of insoluble material, which now form a single body which can be readily translated by sliding or other action to the object it is desired to decorate or to impress.

Aforesaid impression on the layer of water-soluble gum of the decalcomania, up to the present, has been effected by preparing a vitrifiable pigment fluidified by mixture with a vehicle composed of oils, varnishes, resins and organic solvents, etc., in this manner forming a paint or tincture which can be applied by any known printing means to the water-soluble gum of the paper base or to any insoluble film. This printed paint or stain is dried by physical means (evaporation) or chemically (oxidation etc.) and after a certain drying time, the impression is solidified and firm, ready to be applied later, if such be the case, to the insoluble film which, by adhering thereto, serves as support for the transfer.

On the other hand, said water-insoluble film is formed by dissolving any film-forming material in organic solvents such as cellulose, cellulose derivatives, polyester, vinyl resins, etc. This material, once the solvent has evaporated, forms a dry film sufficiently resistant to support the transfer.

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Fire action, once the impression and corresponding film applied to the object to be decorated has been introduced into a furnace, burns and volatilizes, without previous fusing, all organic material, thus freeing the inorganic and vitrifiable pigment which, on reaching the proper temperature, vitrifies and is fused with the surface of the object softened by heat.

In actual practice, however, combustion and volatilization of the organic material and its slag passes through many phases causing movement, cracking and scaling, at times microscopic and at times perceptible to the naked eye, according to the thickness of the impression. In all such cases, however, results are poor and consequently losses are great once unacceptable pieces have of necessity been discarded.

Now pyrography according to the present invention avoids precisely these drawbacks on preventing twisting, cracking and scaling of the vitrifiable impression material during the heat treatment. Thus, on reaching vitrification temperature, the material of said impression has not suffered any movement and the motif or design applied remains perfect in all its parts on the surface of the object.

Such valuable results are obtained by using a fusible vehicle in the pyrographic impression paste. This vehicle, contrary to those employed to date, is capable of returning to the liquid state as consequence of the heat existing in the furnace, before being eliminated through volatilization.

Said vehicle, due to its quality of being able to return to the liquid state when acted upon by heat, i.e., to return to this state prior to impression, will be subsequently termed "reversible," to distinguish same from the vehicles used so far in decalcomanias fluidified with oils, varnishes, etc., and described above as "irreversible" to heat action which, instead of reversing same to the liquid condition in which they were used for printing, contrarily dries and hardens them still further, thus continuing, in an accelerated manner, their initial evaporation and oxidation.

Examples of formulae for reversible vehicles used in decalcomania objects of the present invention are as follows:

Ingredients	Parts By Weight					
	A	B	C	D	E	F
Beeswax.....	16		44			
Cetyl alcohol.....	8	5		46		33
Solid paraffin wax.....	24	13			46.5	
Liquid paraffin wax.....	41		44		46.5	
Carnauba wax.....	1			2		3
Spermaceti.....	2	26				
Stearin.....			2.5			9
WW resin.....	5					
Venetian turpentine.....	3		2.5			11
Castor oil.....		51	7	28	5	33
Lavender oil.....		5		12		11
Ladanum oil.....				5		
Ladanum resi.oid.....				7		

The above listed vehicle formulae, in their fundamental aspect, consist of a wax and a plasticizer in suitable proportions to form a plastic vehicle which is also soft, with a melting point approximately between 20° C. and 150° C.

Said vehicle shall furthermore contain the vitrifiable pigments necessary to decorate the object to which the decalcomania of the present invention is to be applied, the basic feature of the vehicle and pigment as a whole being that of solidifying on cooling and of returning to the liquid state under oven heat, prior to being removed through volatilization.

The waxes cited in the foregoing formulae have been given as examples only, inasmuch as use can be made of

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any wax which, together with a substance acting as a plasticizer, forms a reversible vehicle having adequate plasticity, said vehicle being the basis of the present invention.

In manufacturing the improved decalcomania according to the present invention, the following technique is followed, reference being made to the drawing:

A thin layer of hydrosoluble gum 2 is extended over the surface of an unsized paper 1. Said hydrosoluble gum consists of a solution of dextrine, arabic gum or a gum having similar characteristics.

Once said layer of hydrosoluble gum has dried, printing is effected by means of silk screen, offset, or any other suitable printing process, of the chosen drawing or legend 3, for which purpose a paste is employed consisting of a vitrifiable pigment and the described reversible vehicle.

Printing is to be effected within a chamber, box, or oven where the temperature, previously selected, can be maintained in order that the reversible vehicle, containing the pigment, be kept in molten state during the printing operation, and thereafter will quickly solidify on cooling, as soon as the assembly of paper, hydrosoluble gum and printed design is withdrawn from the chamber or the like where said printing step took place.

Following, by means of a printing or silk screen process, application is made of a liquid nitrocellulose film or other cellulose derivative which, once dried through evaporation, provides the transfer film 4 and leaves the design, drawing, or legend, ready to be transferred to the desired location.

Said transfer is obtained by dipping the decalcomania assembly in water, which dissolves the layer of hydrosoluble gum 2, thus permitting separation of the layer containing the drawing or legend 3 and the transfer film 4, which are adhered to one another, from the unsized paper base 1.

It will now be readily understood that at the moment the object to be decorated with the adhered pyrograph impression is introduced into the furnace, the heat shock received, instead of displacing, twisting and loosening the vehicle and the vitrifiable material, as would happen due to combustion if said vehicle were "non-reversible," melts said "reversible" vehicle instantaneously, leaving a fresh and liquid impression as though same had been applied to the object itself. While said vehicle is quietly volatilizing and the organic materials are evaporating, the vitrifiable pigments suffer no displacement whatsoever until they are entirely vitrified and fused to the surface of the object.

The invention as specified may be clearly understood and no further explanations will be required by those versed in the matter.

Inasmuch as sundry changes as to construction and detail may evidently be introduced without thereby departing from the essential nature of the present invention, it will be understood that the true scope of same is as determined in the following claims.

I claim:

1. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle, said vehicle consisting essentially of a mixture of beeswax 16%, cetyl alcohol 8%, solid paraffin wax 24%, liquid paraffin wax 41%, carnauba wax 1%, spermaceti 2%, WW resin 5% and Venetian turpentine 3%, said vehicle being capable of returning to liquid state upon application of heat prior to volatilizing upon further application of heat.

2. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle, said vehicle consisting essentially of a mixture of cetyl alcohol 5%, solid paraffin wax 13%, spermaceti 26%, castor oil 51% and lavender oil 5%, said vehicle being capable of returning to liquid state through the action of heat prior to volatilizing upon further application of heat.

3. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle, said vehicle consisting essentially of a mixture of beeswax 44%, liquid paraffin wax 44%, stearin 2.5%, Venetian turpentine 2.5% and castor oil 7%, said vehicle being capable of returning to the liquid state through the action of heat prior to volatilizing upon further application of heat.

4. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle, said vehicle consisting essentially of a mixture of cetyl alcohol 46%, carnauba wax 2%, castor oil 28%, lavender oil 12%, ladanum oil 5% and ladanum resinoid 7%, said vehicle being capable of returning to the liquid state through the action of heat prior to volatilizing upon further application of heat.

5. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle, said vehicle consisting essentially of a mixture of solid paraffin wax 46.5%, liquid paraffin wax 46.5%, Venetian turpentine 2% and castor oil 5%, said vehicle being capable of returning to the liquid state through the action of heat prior to volatilizing upon further application of heat.

6. In a vitrifiable decalcomania, a design layer consisting of a vitrifiable pigment and a reversibly fusible solid vehicle for said pigment consisting essentially of a mixture of cetyl alcohol 33%, carnauba wax 3%, stearin 9%, Venetian turpentine 11%, castor oil 33% and lavender oil 11%, said vehicle being capable of returning to the liquid state through the action of heat prior to volatilizing upon further application of heat.

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