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3,553,044 PROCESS FOR TRANSFERRING A DESIGN TO A SURFACE

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3 Claims

ABSTRACT OF THE DISCLOSURE

A process for incorporating a decal as an integral part of a coating surface without the decal adding any appreciable thickness or unevenness to the coating surface is disclosed which comprises applying a printed decal on a solvent soluble polymeric base and applying over the decal a clear coating containing a solvent for the base, wherein the base is dissolved by the solvent and the decal is incorporated into the clear coating.

This invention relates to a unique process for decorating surfaces. More particularly, the invention is directed to a process for incorporating a decal as an integral part of the coating surface without the decal adding any appreciable thickness or unevenness to the surface.

There are numerous methods known for transferring designs from decals to the desired surfaces. In most of the known techniques, an additional thick layer of the decal protrudes beyond the surface layer, destroying continuity and beauty of the overall effect. Many of the difficulties of applying an additional layer decal are described in U.S. Pat. 2,700,629.

A process has been discovered which avoids most of the difficulties that are associated with the transfer of designs. The process of this invention utilizes the technique of incorporating a decal or design which is usually made up of at least one color as an integral part of the coating surface by printing the decal or design onto a solvent-soluble base, attaching the decal and base onto the desired surface to be designed and applying a permanent clear finish coat containing a solvent for solubilizing the base containing the printed decal. The solvent in the finish coat will dissolve the base into the coating at the same time incorporating the design undisturbed into the coating. Thus, the design becomes part of the coating and the additional thickness of the design is not available to destroy the continuity of the coating.

The solvent-soluble base containing the printed decal or design-bearing sheet used in practicing the method of the present invention can be made of polymeric materials such as polystyrene, polyethylene, or the like, or fabrics made of rayon, acetate, silk screen, or the like. The important aspect of the design-bearing sheet is that it is soluble in solvents at least at room temperature or below in common solvents such as aromatic aliphatic hydrocarbons, ketones, esters and ether e.g., Cellosolve products such as 2-ethoxyethanol, 2-ethoxyethyl acetate and the like, methyl isobutyl ketone, acetone, xylene, mineral spirits and the like, which are utilized in the finish coat.

The design i.e., a decorative or graphic art work is printed onto a base which is solvent soluble. The material used to print the decal must be substantially insoluble in the substance to dissolve the base on which the decal is placed. These materials are well known in the art.

A wide variety of surfaces can be decorated by means of the novel method of the invention. Including among such surfaces are, among others, poured concrete; concrete block; cinder block; stucco; brick; stone; drywall; cement plaster; putty coat plaster; gypsum plaster; sand finished plaster; sheet rock; cement-asbestos board; metal; wood; hardboard; particle board; and the like.

Where the surface being decorated is irregular or open textured, as is the case with, for example, cinder block or stucco surfaces, it should be surfaced with a suitable filler coat to bridge or fill surface openings or voids prior to the application of the decal. Among the many materials which can be used for this purpose, the portland cement base compositions disclosed and claimed in U.S. Pat. No. 3,063,851 to Madison, which generally contain portland cement and selected aggregates in a non-aqueous, resinous binder, are particularly suitable. In addition to these, however, any filler material or composition which adheres to the surface being decorated and is substantially insoluble in the solvent used to dissolve the thermoplastic, solvent soluble portion of the decal can be used.

The filler coat is generally best applied by brush, in order to force it into the surface irregularities. In some cases, however, it is also desirable to use a roller after the brush application to work out the brush marks.

When desired, the filler coat can contain pigments or other colorants which will furnish an additional decorative effect to a decal applied thereon. Similarly, where no filler coat is necessary, or even when one has been used, the surface being decorated can be painted by brushing, spraying, roller coating, or the like, with conventional paints or colorants, or otherwise decorated, e.g., by staining in the case of wood, prior to applying the decal.

It is preferred that any filler coat, paint layer, or the like applied to the surface being decorated be allowed to dry to at least a tacky state prior to positioning the decal thereon.

The procedure of applying the decal to the surface being decorated and dissolving the solvent soluble portion of the decal, leaving the decorated portion thereof adhering to the now decorated surface, can be carried out in any of several ways. First of all, the surface being decorated, whether uncoated or coated with filler, paint or the like, can be brushed, sprayed, rolled, or the like with the substance which will dissolve the thermoplastic, solvent soluble portion of the decal, and the decal then applied. If necessary, more solvent or solvent-containing material can then be applied over the decal to complete the dissolution of the non-decorative portion thereof. The decal can also be applied directly to the dry surface and then contacted with the solvent or solvent-containing material. In this latter case, either the surface being decorated or the decal, on the side thereof which will contact the surface being decorated, can if desired be coated with an adhesive which will hold the decal on said surface at least prior to its being contacted with the solvent or solvent-containing substance.

Parenthetically, it should be noted at this point that a decal bearing a decoration or graphic art work on one side only can be positioned with either its decorated side or the other side in contact with the surface being decorated, the sole determining factor being the particular design appearance desired, and also that both sides of the decal can, if desired, be decorated, thus providing greater flexibility of design as well as ease of application of complex designs to the decal. Furthermore, special effects can be produced by using two or more decorated decals, one over the other, with solvent or a solvent-containing substance being applied under the first decal, over each decal, over the last decal only, or in any combination of these possibilities.

When the decal is only contacted with a material which consists essentially of solvent for the solvent soluble portion thereof, the decorative portion of the decal should contain material which will adhesively unite with the surface being decorated.

The coating which is applied to the decal can be any coating which provides a permanent clear finish. The important element in the coating is the solvent which

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will dissolve the base on which the decal is printed. Typical of the coatings which can be used are those described in U.S. Pat. 3,050,480. These coatings contain epoxidized animal, vegetable or marine oil in combination with a poly-base acid in a mutual solvent. Typical of the epoxidized compounds include, among others: methyl linoleate; pentaerythritol oleate; diethylene glycol linoleate; octanol linseed fatty ester acid ester; medium oil soya acid modified alkyl resin; epoxidized soybean oil; and the like. Typical of the polybasic acids, include: chlorendic acid; monochloro phthalic acid, tetrachlorophthalic acid; dibasic acid reactive vinyl copolymers of maleic and fumaric adducts; copolymerized acrylic acid and the like. The solvents which can be used include among others: aromatic or aliphatic hydrocarbons, ketones esters and ethers, e.g., such as acetone; xylene; toluene; diethyl carbitol; methyl ethyl ketone; methyl isobutyl ketone and the like.

The following example will further illustrate the process of the invention without limiting the same:

EXAMPLE

On a polystyrene sheet, the name "Devoe®" is printed in red ink. The red ink is insoluble to a blend of 2-ethoxyethanol-xylene solvent. A wall composed of cinder blocks is painted with a paint formula as described in U.S. 3,063,851. The paint is permitted to dry to a tacky consistency such that the polystyrene sheet containing the name "Devoe®" is placed at the desired location without the use of additional adhesives. The paint layer is permitted to dry completely with decal in place. After the paint film is dried and cured completely, a permanent clear finish coat consisting of epoxidized soybean non-phthalic alkyd resin and chlorendic acid in a blend of 2-ethoxyethanol-xylene solvent as prepared in Example VI of U.S. Pat. 3,050,480, is applied over the decal. The blend of 2-ethoxyethanol-xylene solvent dissolves the polystyrene sheet into the film forming layer while the red ink lettering of "Devoe®" remains in place providing a continuous film with the printing as described becoming an integral part of the film.

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In a similar manner as the example above, any type of design can be utilized to decorate a surface wherein a permanent clear finish coat containing a compatible solvent system for the coating but the solvent dissolves the solvent soluble base of the decal when the coating is applied but does not effect the design itself.

It is understood that the foregoing description is merely illustrative of preferred embodiments of the invention of which many variations may be made by those skilled in the art within the scope of the following claims without departing from the spirit thereof.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process for incorporating a decal as an integral part of a coating on a surface which consists essentially of:

(A) Printing said decal onto a solvent soluble polymeric base;

(B) Attaching said printed base to said surface; and

(C) Applying over said printed base a clear coating containing the solvent for said base;

wherein said base is dissolved by said solvent and said decal is incorporated into said clear coating.

2. The process of claim 1 wherein said base is formed of polystyrene and said solvent is a mixture of 2-ethoxyethanol and xylene.

3. The process of claim 2 wherein said clear coat comprises a mixture of an epoxidized soybean oil and chlorendic acid.

References Cited

UNITED STATES PATENTS

1,872,131	8/1932	Ensminger	156—237
2,271,491	1/1942	Rathke	156—236
3,334,003	8/1967	Edwards	156—236X

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