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METHOD OF DECORATION

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This invention relates to methods of decoration and more particularly to a method of mounting decorative films on objects or base materials, primarily for industrial uses in the manufacture of various articles and materials.

In the application of surface decorations to articles of manufacture according to known methods, there are utilized decorated films which are applied to the surfaces of the objects or materials to be decorated for obtaining various ornamental effects. Such films, for example the lacquer and other films are well known in the art. Heretofore, in accordance with certain prior art methods of mounting the films on the objects or base materials, it was the practice to utilize certain solvents applied either to the surface of the decorative film or to the surface to which the film is to be affixed or to both of such surfaces, and such practice involved the application of the solvent before mounting or uniting the film and object. The purpose of this was to condition the surface of the film or the surface of the object which was first usually provided with a priming coating, the solvent acting to render the surface tacky for adhesively binding the film and object together. In certain of the prior art methods the solvent was mixed with water for the purpose of delaying the action of the solvent. For example, in mounting lacquer films there has been utilized in the past a lacquer solvent comprising ethyl lactate and water, the function of the water being to delay the action of the active lacquer solvent, that is, the action of the ethyl lactate. As there is only a limited number of active lacquer solvents which are compatible with or properly miscible with water the old methods referred to necessarily required a special selection of chemical solvents. Moreover, the application of the solvent either to the surface of the object or base material or to the surface of the decorative film before the application of the latter in proper position on the object affects the decorative film, which is usually very thin and elastic, making it difficult to properly mount the same and frequently resulting in the distortion of the film and in the decorative design carried thereby. The primary object of the present invention is to obviate these difficulties.

More specifically stated, one object of the present invention is to provide a method of mounting films or base objects or materials according to which it is unnecessary to apply the solvent before the film is mounted on the object. Conversely stated, this object of the invention is to provide a method of mounting decorative films on the bases thereby decorated whereby the solvent for the film is not applied until after the film has been placed in the proper position on the base to be decorated thereby.

Another object of the invention is to provide a method of decorating objects and materials whereby the mounting of the decorative film is greatly facilitated and the distortion of the film prevented.

Another object of the invention is the provision of a method of mounting decorative films which makes unnecessary the application of a priming coating to the surface of the object except possibly where the priming coating is necessary for obtaining the desired smoothness on the surface of the base object or material.

It is also an object of the present invention to provide a method of decoration in which it is unnecessary to utilize masks or mask devices or materials when it is desired to apply a decorative film to a part only of the surface of the object without affecting the other surface portions of the latter.

A further object of the invention is to provide a method of applying decorative films which can be performed quickly and accurately, obviating the need for highly skilled labor and which therefore is highly advantageous for industrial uses, more particularly in mass production.

A yet further object of the invention is generally to improve the art of applying decorative films to objects or base materials.

In accordance with the method of the present invention and in contrast to the prior art methods the lacquer film is first brought into contact with the base material or object without the intermediate application of any lacquer or film solvent. The great importance of this feature of the present method cannot be underestimated since the absence of the lacquer solvent at the time of the application of the decorative film to the base permits the decorative film to be applied and conformed to the surface of the base with the utmost ease and as slowly as may be necessary for properly conforming the decorative film to the surface of the base. In order, however, to facilitate the movement of the decorative film on the surface of the base, in the act of applying the decorative film to said surface, said film is first wet with ordinary water which acts as a lubricating or skidding agent enabling the operator to readily move or work the film and fit the same neatly in position without the danger of the film sticking or setting while it

is being placed in the desired position or shape depending upon the shape of the surface to be ornamented. After the decorative film has been properly positioned and shaped to the surface of the base, a solvent for the film is sprayed, swabbed over or otherwise applied to the exposed surface of the film when the latter is in the desired position. The solvent is preferably in its pure and undiluted strength and working down through the thickness of the film to the base surface results in a fast and very effective and thorough binding together of the contiguous surfaces of the base and decorative film. When the solvent is applied to the film it converts the latter into a semi-liquid or very soft and plastic condition which on this account results in the rapid, thorough and secure binding. This phenomenon may be compared with the fast binding action which takes place when a white enamel consisting of pigmented lacquer is sprayed over a surface. An element of surprise in the present method is that although the application of the undiluted lacquer solvent to the film imparts a semi-liquid consistency to the latter, the design on the lacquer film is entirely unimpaired as is also the contour of the film. Another important advantage of my method as just previously described results from the fact that it is unnecessary to dilute the lacquer solvent with water, and said solvent can be of any of the well known solvents such as acetone, ethyl acetate, butyl acetate, amyl acetate (the last three mentioned solvents not being soluble in water), ethyl lactate, butyl lactate, butyl "Cellosolve," etc. It will be understood also that the present methods are not limited to lacquer films but can also be used with other films such for example as the synthetic films as for instance any urea formaldehyde compound.

In using lacquer and other films which have been applied to paper sheets, the patterns and sizes are cut while the film is still on the paper backing, and then the films are removed from the paper by dipping in water the usual way. The lacquer or other films thus wet with water and cut to the shape and size desired may be then applied to the surface of the base for example to the surface of the metal objects, that is, objects of steel, brass, various die castings, etc., it being unnecessary to apply a priming coating to such objects as the latter, especially where cold rolled steel and brass are used, are generally sufficiently smooth for the direct application of the decorative films thereto after the surfaces thereof are thoroughly cleaned with the proper cleansing agents as in the usual practice. However, it is within the scope of the present invention to apply a priming coating to the surface of the object for smoothing the latter. if this should be necessary, before applying the decorative films thereto. If this is done it is then necessary that the priming coat be of such nature that it is not attacked by solvents which are used for penetration of the film; or if the primer is of a base similar to the base of the film applied thereto it is necessary that caution be exercised to avoid too much solvent. Excess solvent penetrates the film and base and would cause a bleeding of the design. If the primer used is not soluble by the film solvents this hazard is eliminated. As hereinbefore stated the water in which the film has been dipped acts as a lubricating or skidding agent and facilitates the application of the film to the surface of the base and permits the film to be properly shaped and fitted in conformity with the surface to which it is applied. On this account the decorative film may be rapidly applied by unskilled workmen. When the film has been placed in the desired position on the surface of the base, the water and air between the contiguous surfaces of base and film are eliminated preferably by utilizing a flexible rubber squeegee which is applied to the exterior surface of the film with a light pressure starting from the center and working toward each edge of the film. As the film is very smooth and as the surface of the base is also smooth, there is a natural temporary adhesion after the water and air have been removed from between the two surfaces, and such temporary adhesion is at least sufficient to hold the film in place until the application of the solvent thereto. Under certain conditions, particularly where the shapes are highly irregular, it is helpful if the object to be decorated is warm, that is, between 90° F. and 110° F. Also it may be desirable to utilize warm water, that is, water in the range of the temperature just mentioned. After the water and air is eliminated from between the contiguous surface of base and film, the exterior of the film is then carefully dried for which purpose a soft cloth may be used. Then, after the elimination of the water and air from between the contiguous surfaces of base and film and after the drying of the exterior surface of the film the film solvent is applied by spraying or swabbing the same over said exterior film surface, the application of the solvent to the film by spraying being preferred. The solvent thus applied to the film flows on the surface thereof penetrates the latter and is immediately absorbed converting the film into a semi-liquid or "wet paint" state. Said solvent penetrates the film through the entire thickness thereof down to the base and as pointed out above effects a rapid, thorough, and secure binding together of the contiguous surfaces of base and film. The solvent thus applied in proper quantity to insure a complete softening of the entire body of the lacquer film then starts to evaporate and after evaporation thereof the film returns to its original solid state but is as indicated securely affixed to the surface of the base.

The method of the present invention while useful with great advantage for ornamenting metal surfaces is also and particularly useful for decorating non-metallic objects and base materials especially glass. The present method is also highly desirable for use in decorating surfaces where masking of portions of the surface would ordinarily be necessary and which is rendered unnecessary in accordance with the present method. Thus, for example, for decorating mirrors made of glass it is merely necessary in accordance with the present invention to blank out a given shape or design of the lacquer film and then to apply said shaped film to the appropriate portion of the surface of the glass. The film having been wet with water for facilitating the proper positioning and working thereof on the glass surface is placed so that the design on the film will be visible through the glass, leaving the areas to be mirrored free of any prime coating or adhesive agents. Then, after eliminating the air and moisture from the film the film or other solvent is applied to soften the film to a "wet paint" consistency for securely binding the film to the surface of the glass. As the solvents used in accordance with the present method have no solid constituents said solvents

immediately evaporate from the glass surface which is not covered by the lacquer film, leaving this surface in proper condition for treatment for providing the mirrored surface. It is apparent that no masking is required. In the case of glass, warming the glass, when the film is applied by water, increases the period of temporary adhesion. Also as in most cases the film used is thermo-plastic, such film when applied against the warm glass or other surface becomes soft and on this account has a certain degree of adhesion to the surface to which it is applied.

The utility of my method in applying the decorative films to articles of manufacture particularly in industrial or mass production is believed to be apparent. Particularly it will be observed that in applying a lacquer or other film to a surface of complicated or irregular shape, having curves or angles, it is ordinarily difficult to follow the prior art methods according to which the base coat applied to the base surface of the decorative film are softened and rendered tacky by the solvent, since in following such method considerable trouble arises from the fact that the surface of base and film adhere to each other prematurely, that is, before the operator can place the film in proper position on the object. Furthermore, when the solvent is applied to the film before the latter is mounted in proper position on the base surface, the solvent renders the film tacky, sticky, and apt to stretch, whereby it is difficult to handle particularly in matching sizes or irregular shapes. On the other hand, in accordance with the present method where the film is treated only with water prior to being mounted upon the base surface, said film can be worked and handled indefinitely in moving the same in various positions to fit the film to the curvature of the base. In case it is necessary to stretch the film somewhat for properly fitting the same to the base surface, warm water can be applied to the film for imparting to the same a temporary stretchability, and subsequently the film can be returned to its original degree of flexibility by cooling with cool or cold water. Furthermore, in accordance with the present methods, it is ordinarily unnecessary to apply a prime or base coat heretofore required for ornamenting surfaces in accordance with prior art methods. Thus it is seen that the present method has numerous important advantages over the prior art methods, certain of said advantages having been pointed out and other advantages being apparent to those skilled in the art.

While I have described more or less in detail the preferred manner of practicing my method in accordance with the present invention, it will be understood that said method is subject to changes in respect to details of operation which will readily occur to skilled artisans particularly in view of the present disclosure. Therefore, I do not wish to be limited precisely to the method as herein specifically described except as may be required by the scope of the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The method of attaching a decorative film to a base, which comprises first placing said film on the base surface, and then applying a solvent for said film thereto while on the base to render the same sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

2. The method of attaching a decorative film to a base which comprises moistening said film with a liquid in which said film is substantially insoluble, applying said film, while moist, to the surface of the base, then eliminating the moisture, and then applying a solvent for said film thereto while on the base and to the surface of the film remote from the base to render the film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

3. The method of attaching a decorative film to a base which comprises moistening said film with water, then applying said film, while moist, to the surface of the base, then eliminating the moisture, and then applying a solvent for said film to the surface thereof remote from the base attached surface to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

4. The method of attaching a decorative film to a base, which comprises placing said film on the base surface, and then applying a solvent for said film while on the base to the surface of said film remote from the contiguous film and base surfaces, in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof, thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

5. The method of attaching a decorative film to a base which comprises moistening said film with a liquid in which said film is substantially insoluble, then applying said film, while moist, to the surface of the base, then eliminating the moisture, and then applying a solvent for said film while on the base to the surface of said film remote from the contiguous film and base surfaces, in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof, thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

6. The method of attaching a decorative film to a base which comprises moistening said film with water, then applying said film, while moist, to the surface of the base, then eliminating the moisture, and then applying a solvent for said film to the surface thereof remote from the contiguous film and base surfaces while said film is on the base, in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof, thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

7. The method of attaching a lacquer or similar film to a base, which comprises cleaning the surface of the base to which the film is to be attached, temporarily adhering said film to said surface, and then while said film is in position with one surface in contact with said base surface applying to the other surface of said film a solvent for the material of said film, in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof, whereby to render said film sufficiently plastic or soft to cause cohesion between the

contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

8. The method of attaching a lacquer or similar film to a base, which comprises moistening said film with water, then applying said film while it is moist to the surface of said base and then while said film is in position with one surface thereof in contact with said base surface applying to the other or exterior surface of the film a solvent therefor, in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof, thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

9. The method of attaching a sheet supported transfer film to a base which comprises moistening said film with water to remove the film from its supporting sheet, then while said film is wet mounting it on the surface of said base, then eliminating the moisture from the film and base surfaces while the film is on said base, and then applying a solvent for said film thereto while the latter is on the base to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

10. The method of attaching a sheet supported transfer film to a base which comprises moistening said film with water to remove the film from its supporting sheet, then while said film is wet mounting it on the surface of said base, then eliminating the moisture from the film and base surfaces while the film is on the base, and then while the film is on the base applying a solvent for said film to the surface thereof remote from the contiguous film and base surfaces in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

11. The method of attaching a decorative film to a base, which comprises warming the base surface to which said film is to be attached, placing said film on said surface while the latter is warm, applying a solvent for said film thereto after it is placed on said base and is in engagement therewith to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

12. The method of attaching a decorative film to a base, which comprises warming the base surface to which said film is to be attached, moistening said film with a liquid in which said film is substantially insoluble, mounting said film on said base surface while the latter is warm, and then while the film is on the base, applying a solvent for said film thereto to render the same sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

13. The method of attaching a decorative film to a base, which comprises warming the base surface to which said film is to be attached, moistening said film with a liquid in which said film is substantially insoluble, mounting said film on said base surface while the latter is warm, and then, while the film is on the base, applying a solvent for said film to the surface thereof remote from the contiguous film and base surfaces in an amount sufficient to penetrate the film for the full thickness thereof throughout the extent thereof thereby to render said film sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

14. The method of attaching a decorative film to a base, which comprises warming the base surface to which said film is to be attached, moistening said film with water, mounting said film on said base surface while the latter is warm, and then, while the film is on the base, applying a solvent for said film thereto to render the same sufficiently plastic or soft to cause cohesion between the contiguous base and film surfaces and a firm binding therebetween upon evaporation of said solvent.

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