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METHOD FOR REMOVING PAINT AND VARNISH

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This invention relates, as indicated, to a process for paint or varnish removal, and more specifically to a method for preparing furniture or the like for refinishing.

Prior practice in surface refinishing has evolved from the earlier mechanical techniques of sanding, scraping, and burning to the current practice of employing solvents. While much of the hard labor is now avoided with such solvents, this has been achieved at the expense of neatness. Solvent removal methods do reduce the time required over the earlier methods. However, the chemicals used frequently burn and dry out the skin of the worker. The soft gummy residue that is produced quickly clogs tools used to remove it, e. g., steel wool, spatulas, etc. If the surface from which the old dried film is being removed is certain types of mill work or filigree, it is very difficult to clean the surface.

It is a principal object of this invention, therefore, to provide an improved method for removing paint, lacquer, and varnish films from a substrate.

Another object is to provide an improved method for removing dried paint, varnish, enamel, etc. films in which the chemical agents used are less irritating to the refinishers.

Still another object is to provide an improved method for paint, varnish, etc. removal which yields more complete removal of the old film from intricate design or mill work necessitating little or no further preparation before refinishing.

Another object of this invention is to provide an improved method for paint, varnish and lacquer removal in which the old film is removed as substantially larger continuous sheets than heretofore.

Other objects of this invention appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the appended claims, the following description setting forth in detail certain illustrative embodiments of the invention, such disclosed means constituting, however, but a few of the various forms in which the principle of this invention may be employed.

Broadly stated, this invention comprises the provision of an improved method for removal of dried organic films from a substrate which comprises coating said film with a composition comprising a major amount of a liquid halogen-containing alkane of no more than 2 carbon atoms and having a boiling point less than about 100° C. and a minor amount of a cellulose derivative, and after the dried film has softened, overcoating the softened film with a composition comprising in admixture a normally liquid hydrocarbon, an alcohol and an ester of an aliphatic carboxylic acid and an alcohol, which ester contains from 3 to 5 carbon atoms, and then stripping the resulting soft film from the substrate.

Thus this invention contemplates the sequential treatment of a hardened paint, varnish or lacquer film with two liquid compositions, the first of which is a combination of a swelling agent and a film-forming material, and the second of which contains non-solvent diluents and low boiling solvents for both the old film and the new film. The solvent action is believed to be such as to cause partial intermingling of the new and the old films for adhesion of one to the other but on evaporation from the mass leaves behind a film system which is insoluble in the remaining solvents and diluents. The film also entraps

the swelling agent which loosens the film from the substrate and permits ready removal of the entire mass from the substrate.

As above indicated, a principal ingredient of the remover system is a normally liquid halogen-containing alkane of no more than two carbon atoms having a boiling point of less than about 100° C. There are relatively few materials which are thus included among which may be mentioned methylene chloride, ethylene chloride, methylene bromide, ethylidene dichloride, 2,2-difluoro-1,2-dibromoethane, 2,2-difluoro-1,1-dichloroethane, 2,2-difluoro-1-iodoethane, carbon tetrachloride. Chloroform will work, but for obvious reasons its use is not recommended. Thus, any halogen, i. e., chlorine, bromine, iodine, or fluorine, and combination of halogens may be present as the swelling agents for the initial treating fluid. Such normally liquid halogen-containing methanes or ethanes are usually present in non-flammable paint and varnish removers.

A second essential ingredient of the first treating liquid is a film-forming material which while preferably, although not necessarily, soluble in the composition, is or becomes a surface coating acting as a "blotter" for the halogen compound-varnish solvate. A very satisfactory class of such film formers includes the water-insoluble gums, e. g., cellulose ethers and esters of both organic and inorganic acids. Thus, nitrocellulose, cellulose acetate, cellulose acetate-butyrate, cellulose propionate, cellulose acetate-propionate, and other such aliphatic carboxylic acid esters of cellulose; ethoxy cellulose, benzyl cellulose, etc.

In the paint and varnish remover, the weight ratio of the halogen compound to the cellulose film-forming compound is from about 5:1 to about 25:1. To improve the solubility of the cellulose derivative in the system, a small amount of alcohol, e. g., methyl, ethyl, iso-propyl alcohol, or mixed alcohols may be used. The composition may also contain an HCl acceptor to improve shelf stability of the composition. Alkylene oxides may be used for this purpose. Such additional ingredients enhance the practical utility of the basic two component paint and varnish remover.

The second treating liquid is usually applied after the first has had at least a minimum of 30 seconds to work on the old film. It may, however, be applied with a longer or shorter lapse of time. The purpose of the second liquid is two-fold. It contains a powerful solvent, e. g., acetone, dioxane, or an acetate ester of methyl, ethyl, propyl, butyl, or amyl alcohols such as commonly employed in lacquer solvents. It also contains a material which is a solvent for the lacquer solvent agent, but which is in itself a poor solvent for cellulose derivatives. These are usually aliphatic hydrocarbons of petroleum origin or aromatic hydrocarbons, or a blend of both. Examples of aliphatic hydrocarbons useful herein are any of the normally liquid aliphatic hydrocarbons boiling below about 400° F., e. g., petroleum fractions such as kerosene, gas oil, gasolene, mineral spirits, petroleum ether, etc., or the refined materials such as hexane, heptane, cyclohexane, octane, decane, etc. It apparently makes no difference whether the aliphatic hydrocarbon is saturated or unsaturated. The aromatic hydrocarbons useful herein include benzene, toluene and xylene.

It is frequently desirable to include in the hydrocarbon portion of the second composition a terpene hydrocarbon such as turpentine, alpha pinene, beta pinene, limonene, dipentene, or the like. The hydrocarbon portion of the second treating liquid usually amounts to from 50% to 75% by weight, and may be a single hydrocarbon or a mixture of members selected from the three classes of hydrocarbons mentioned above.

An essential component of the second treating solution is an aliphatic alcohol, e. g., methyl, ethyl, or iso-propyl alcohol or a mixture thereof. From 4% to 10% by weight of the second solution is alcohol.

It is convenient at this point to give examples of solutions A and B which may be used in carrying out the procedure constituting my invention, it being understood that such examples are formulated in accordance with the broader teachings above as illustrative of the mode

of compounding such materials, but not limiting the scope of the invention to such compositions. Those skilled in the art will readily comprehend the formulation of other solutions after an understanding of those herein exemplified.

Example I

Solution A:	Parts
Methylene chloride (CH_2Cl_2)	92
Ethoxy cellulose (45%–48% std.)	8
Ethyl alcohol	7

Solution B:	Parts
Toluene	25
Mineral spirits	50
Ethyl acetate	25
Ethyl alcohol	15

Example II

Solution A:	Parts
Ethylene chloride ($C_2H_4Cl_2$)	85
Cellulose acetate-butyrate	7

Solution B:	Parts
Xylol	15
Turpentine	5
Mineral spirits	45
Acetone	20
Ethyl alcohol	10
Butyl cellosolve (mono butyl ether of ethylene glycol)	3

Example III

Solution A:	Parts
Carbon tetrachloride	50
Methylene chloride	35
Cellulose nitrate	9

Solution B:	Parts
Benzene	25
Turpentine	10
Hexane	65
Butyl acetate	15
Methyl alcohol	10

Example IV

Solution A:	Parts
Methylene chloride	96
Cellulose acetate	5
Ethyl alcohol	6
Paraffin wax	2
Propylene oxide	.5

Solution B:	Parts
Turpentine	1
Ethyl alcohol	2
Toluene	3.5
Mineral spirits	7
Ethyl acetate	3.5

The manner of application of these solutions is not critical. They may be sprayed, brushed, rolled or wiped on the surface. Since the surface after exposure to solution A is quite sticky and wet, brush or spray application of Solution B is preferred. For example, Solution B may be admixed with a normally gaseous propellant material, e. g., a fluorochloro methane, such as F_2CCl_2, etc., and applied from an aerosol can as a fine spray.

A procedure in accordance with this invention involves application of a paint and varnish remover such as exemplified above as Solution A. The remover is allowed to act on the old paint or varnish film until it begins to soften. Usually from a few seconds to several minutes are required. Then Solution B is applied directly to the partially softened old film by spray or brush, for example. After a short time of a few minutes, the old paint or varnish film can be removed almost as an intact stripable film which is not sticky or gummy. Tools remain unclogged. In many cases, the film may be picked up with the fingers and stripped off. Removal is much easier and complicated designs and mill work are readily freed of old finish. Little or no preparation of the bare surface is required prior to refinishing in many cases. Considerable labor is therefore saved.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed, provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore, particularly pointed out and distinctly claimed as the invention:

1. The method of removing a dried organic film from a substrate comprising coating said film with a paint and varnish remover comprising a major amount of a normally liquid halogen-containing alkene of no more than 2 carbon atoms and having a boiling point less than about 100° C., and a minor amount of a cellulose derivative, after the old film has softened, overcoating the softened film with a second composition comprising in admixture a normally liquid hydrocarbon, an alcohol, and an ester of an aliphatic carboxylic acid and an alcohol, which ester contains from 3 to 5 carbon atoms, and then stripping the resulting softened and loosened old film from the substrate.

2. The method of claim 1 in which the paint and varnish remover comprises a major amount of methylene chloride and a minor amount of a cellulose ester of an aliphatic carboxylic acid.

3. The method of claim 1 in which the paint and varnish remover comprises a major amount of methylene chloride and a minor amount of cellulose acetate.

4. The method of claim 1 in which the paint and varnish remover has the following composition:

	Parts
Methylene chloride	50–100
Cellulose acetate	3–7
Ethyl alcohol	4–8
Propylene oxide	0.5

5. The method of claim 1 in which the second composition comprises in admixture a mixture of normally liquid hydrocarbons, an aliphatic alcohol, and an ester of acetic acid and a low molecular weight alcohol of no more than 3 carbon atoms.

6. The method of claim 1 in which the normally liquid hydrocarbon is a mixture of an aliphatic hydrocarbon and an aromatic hydrocarbon.

7. The method of claim 1 in which the normally liquid hydrocarbon is a mixture of an aliphatic hydrocarbon, an aromatic hydrocarbon and a terpene hydrocarbon.

8. The method of claim 1 in which the second composition has the following formulation:

	Parts
Turpentine	1
Ethyl alcohol	2
Toluene	3.5
Mineral spirits	7
Ethyl acetate	3.5

9. The method of removing a dried organic film from a substrate comprising coating said film with a paint and varnish remover having the following formulation:

	Parts
Methylene chloride	96
Cellulose acetate	5
Ethyl alcohol	6
Propylene oxide	0.5
Crude paraffin wax	2

after the old film has softened, overcoating the softened film with a second composition having the following formulation:

	Parts
Turpentine	1
Ethyl alcohol	2
Toluene	3.5
Mineral spirits	7
Ethyl acetate	3.5

and then stripping the resulting softened and loosened old film from the substrate.

No references cited.