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PAINT, VARNISH, AND LACQUER REMOVER

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My invention relates to paint, varnish and lacquer removing agents, and has for an object the provision of such agents which shall contain as a principal ingredient thereof what is known in the paper industry as "floating soap".

"Floating soap" is that saponaceous product (see Michelson U. S. Patent 1,823,752) which is formed in the black liquor produced in the digestion process in the production of paper or other cellulosic products by the sulphate or soda process, and which in parts separates and floats to the top of the liquor drained from the pulp after digestion, and which also is in part in solution in the liquor and may be separated out by centrifugal separation or other methods.

"Floating soap", so called, contains the alkali salts of a complexity of fatty and resinous acids, higher alcohols, and a number of other compounds, many of which have not as yet been identified. While no dependable analysis of "floating soap" is available, it is known to treat the product, as set forth in the Michelson patent mentioned above, in such a manner as to free the acid constituents and alcohols from the "floating soap" and obtain a complex mixture of such constituents which is known in the trade as "Tallol".

Among the compounds which have been identified in "floating soap" are the sodium salts of oleic acid, palmitic acid, linolenic acid, capric acid, and linoleic acid, and unidentified unsaponifiable compounds. (Hasselstrom Paper Trade Journal, July 8, 1926, page 60, Chem. Abs. 20: 3566). Also in Sandquist, Berichte 64 B, page 2172–4, (Chem. Abs. 26: 472), there are identified a salt of lignoceric acid, lignoceryl alcohol and phytosterol. Aschan in Finska Kem. Medd. 1918, page 8, (Chem. Abs. 13: 2868), describes salts of pinabietic acid. Dittmer in Z. Angew. Chem., vol. 39, page 262 (1926) (Chem. Abs. 20: 2072), describes abietic acid as well as confirming the work of other investigators, and mentions other unidentified hydrocarbons.

E. Phyala in Svensk. Pappers Tid. vol. 29, 601–4, 627–9 (1926) (Chem. Abs. vol. 21, page 2072) separates the so-called "floating soap" according to viscosity into twelve classifications ranging from easily mobile fatty oil to a black asphalt like resin. Among compounds not mentioned by other investigators and identified by this author are recinoleic acid, erucic acid, erythrose and mannose.

Besides the above mentioned compounds, the so-called "soap" contains free sodium hydroxide, free sodium sulphide, free sodium carbonate, free sodium acetate, and other unidentified materials. The physical and chemical properties of different samples vary to a certain extent depending upon the conditions of manufacture and the woody material from which it is obtained.

My invention has for a further object the provision of a paint, varnish and lacquer remover which shall contain as a principal ingredient "floating soap".

A still further object of my invention is the provision of a paint, varnish and lacquer remover which shall contain any one or more of a number of known compounds having paint, varnish and lacquer solvent properties, together with "floating soap" and, in the case of emulsions, a stabilizing agent which may comprise any fatty acid, such as rosin or "tallol," or any mineral acid which will form a fatty acid with the "floating soap."

I have discovered that "floating soap" alone has remarkable penetrating properties, as well as paint, varnish and lacquer removing properties, and is also an effective agent for the removal of rust and grease from metal surfaces. When combined with other substances, such as hereinafter mentioned, having the property of dissolving paint, varnish and lacquer, I have found that it greatly enhances those properties and renders such solvents far more efficient in the removal of paints, varnishes and lacquers.

Among the solvents which I have found to be especially useful might be mentioned amylene dichlorides, ethylene dichloride, trichlorethylene, diacetone, isopropyl ether, carbon tetrachloride, mono methyl ethylene glycol ether, dioxan, acetone, ethyl lactate, mono ethyl ethylene glycol ether, dichlormethane, and ethyl acetate. Other equivalent solvents will suggest themselves to those skilled in the art.

The amylene dichlorides mentioned above are sold on the open market and comprise a mixture of amylene dichlorides in which the chlorine atoms are attached to adjacent carbon atoms.

One example of my invention, in the form of an emulsion, may comprise the following:

Example 1

	Per cent
Amyelene dichlorides	20.0
Oleic acid	3.3
"Floating soap"	10.0
Water	66.7

In making the above emulsion, the "soap", oleic acid and amylene dichlorides are preferably heated together to about 165° F. The mixture is stirred slowly with a mechanical agitator

and as soon as the "soap" is fairly well dissolved, the water at about the temperature of the mixture is added and the mixture agitated until a smooth creamy emulsion is produced, the emulsion thus produced, I have found to be very stable, and I think permanent, sample batches made up in the manner described having stood for more than a month without separating out. The constituents described above may be mixed cold, but I have found the emulsion resulting therefrom less stable than when mixed hot. However the paint, varnish and lacquer removing qualities of the mixture appear to be substantially the same, whether mixed hot or cold.

If desired, a finely divided abrasive, such as powdered flint, stack ash, silicon carbide or aluminum oxide, may be added to the emulsion when making it. The abrasive will be found to accelerate the removal of the paint, varnish or lacquer. Any desired amount may be added, though 5% will ordinarily be found to be sufficient.

The oleic acid mentioned in Example 1 acts as a stabilizer for the emulsion. In place of the oleic acid, I may use any fatty acid or mixture of fatty acids, such as rosin or "tallol", or any mineral acid which will form a fatty acid with the "floating soap". Where rosin is substituted for the oleic acid, a higher temperature is required in forming the emulsion, for obvious reasons.

Likewise, "tallol" may be substituted for the oleic acid with equally good results, so far as the removal of paints, varnishes and lacquers is concerned, but the resulting emulsion is not quite so smooth as that produced with the oleic acid. As is well known, "tallol" is that product produced by the reaction of a strong acid, such as sulphuric, with "floating soap".

The compositions described in Example 1, or an equivalent composition including equivalents of the solvents and stabilizers given, is effective for the removal of practically all paints and varnishes, as well as a wide variety of lacquers now on the market. With certain types of lacquers, especially the well known cellulose derivative lacquers, I have found it desirable to form a solution comprising a combination of solvents with the "floating soap". One example of such a solution made in accordance with my invention is as follows:

Example 2

	Per cent
Amylene dichlorides	37.5
Alcohol	37.5
"Floating soap"	25.0

The constituents are mixed and stirred cold until a good solution is obtained.

In the product given in Example 2, I have found that the solvent properties of amylene dichlorides and alcohol are greatly enhanced by the "floating soap", due, in my opinion, to the remarkable penetrating properties which I have found that the "soap" possesses. The solution given in Example 3 may be employed by simply wetting the surface of the article from which the lacquer is to be removed, allowing it to stand for a few minutes, and then wiping it off with a cloth or brush. With emulsion types, they may be applied with a rag, or the article may be dipped into the emulsion. About five minutes after application the paint, varnish or lacquer may be readily scraped, rubbed or brushed off. Where large surfaces are to be cleaned, a power driven brush greatly facilitates the speed with which the paint, varnishes and lacquers may be removed. The rate of removal may also be greatly accelerated by the addition of up to 5% of an abrasive to the emulsion, as heretofore described, and when so added to the emulsion, the abrasive will remain in suspension and will not settle out of the emulsion. The emulsions used are also effective for removing baked enamel finish where an abrasive is incorporated.

In removing paints from metals in a production line it is often desirable to spray the metal with or immerse it in the removing compound. It is then desirable to have a composition of more aggressive action on the coating. For this purpose I have found it desirable to form a solution comprising a solvent or combination of solvents, "floating soap" and a mineral acid. The most desirable mineral acid has been found to be phosphoric. One example of such a solution made in accordance with my invention is as follows:

Example 3

	Per cent
Mono butyl ethylene glycol ether	30
Phosphoric acid—85% syrup	50
"Floating soap"	20

The constituents are mixed and stirred until a good solution is obtained. It will be understood, of course, that the phosphoric acid entering into the solution combines in part with the "floating soap" to form "tallol". The remainder remains as free acid.

In the product given in Example 3 I have found that the solvent properties of mono butyl ethylene glycol ether are greatly enhanced by the "floating soap" and that the phosphoric acid aids in completely cleaning the metal surface by dissolving pigments, rust, scale, soldering "acid", and other incrustants. The solution given in Example 3 may be employed by wetting the surface of the metal with the solution by dipping or spraying and after a short contact period (5 to 15 minutes), washing off with water.

In Example 3 "tallol" derived from "floating soap" may be substituted for the "floating soap". Other solvents such as mono butyl diethylene glycol ether, mono ethyl diethylene glycol ether, mono ethyl ethylene glycol ether, mono methyl ethylene glycol ether, butyl lactate, butyl alcohol, diacetone, dioxan, ethyl lactate, acetone, ethyl alcohol, methyl alcohol, isopropyl alcohol and similar solvents may be used.

Among the advantages and novel properties of "floating soap" as a constituent of the emulsion or solvent types of removers are:

(1) It constitutes a cheap and effective emulsifying agent for solvents.

(2) In removing paint, the "soap" tends to surround the paint particles and carry them into suspension.

(3) Its penetrating powers aid the solvent in penetrating the paint film and in loosening it from the surface.

(4) The rust inhibiting qualities of the "soap" prevent rust or corrosion even if the solvent used is in itself corrosive.

(5) It will remove rust and grease spots as readily as the paint, varnish or lacquer.

(6) The "soap" will suspend abrasives in the remover making its action faster on some paints and lacquers.

(7) The lubricating qualities of the emulsion make it easier to work into the surface.

(8) The wax content of the "soap" prevents

the emulsion from drying too fast on the work.

(9) The high water content of the emulsion tends to eliminate fire hazards and greatly decreases the loss of solvent during both use and storage.

(10) The ease with which emulsions may be diluted with water allows a considerable saving in shipping costs.

(11) The "soap" is particularly active in emulsifying the gum, resin or wax content of the film to be removed.

(12) The film of "soap" left on the work will not be detrimental to a new paint film as the "soap" is soluble in nearly all paint solvents and tends to produce elongation of film in lacquers.

(13) Any emulsion remaining on the work may be washed off with water if so desired. This is especially advantageous when a protection coat is to be removed and the work is to be prepared for electro-plating.

(14) The emulsions are very stable to electrolytes and hydrolysis of the solvent appears to have little effect on their stability.

It will be obvious from the foregoing that I have devised an improved paint, varnish and lacquer remover having incorporated as a principal ingredient therein "floating soap", which is extremely economical of manufacture, being made principally from a waste product of the paper industry, and which is remarkably effective for the purposes described.

It will also be apparent that the proportions given in the examples recited herein are to be taken as illustrative only, and that they may be varied from widely, without departing from the spirit of my invention; and while I have described my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications, without departing from the spirit thereof. I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1 A paint, varnish and lacquer remover which is also suitable for cleaning metal, a rust inhibitor, and a degreasing agent, containing as an essential ingredient "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material.

2. A paint, varnish and lacquer remover comprising as active ingredients "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, and an organic paint solvent.

3. A paint, varnish and lacquer remover comprising as active ingredients "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, an organic paint solvent, and a higher fatty acid.

4. A paint, varnish and lacquer remover the essential ingredients of which are "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, an organic paint solvent, a higher fatty acid, and a finely divided gritty inorganic abrasive.

5. A composition of matter the essential ingredients of which are an aliphatic chlorinated hydrocarbon paint, varnish and lacquer solvent, an aliphatic alcohol and "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material.

6. A paint, varnish and lacquer remover comprising amylene dichlorides, "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material equal to approximately one-half the weight of the amylene dichlorides, and a higher fatty acid amounting to approximately one-tenth the combined weight of the amylene dichloride and the "floating soap".

7. A paint, varnish and lacquer remover the essential ingredients of which are amylene dichlorides, "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, and "tallol".

8. A paint, varnish and lacquer remover containing as essential ingredients "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, and phosphoric acid.

9. A paint, varnish and lacquer remover the essential ingredients of which are "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, phosphoric acid, and an organic paint solvent.

10. A paint, varnish and lacquer remover comprising a solution of "floating soap" obtained from the black liquors in the manufacture of soda or sulphate cellulosic material, phosphoric acid, and mono butyl ethylene glycol ether, the "floating soap" comprising substantially 20% of the composition.

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