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CLEANING COMPOSITION

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This invention relates to cleaning compositions and to methods of producing the same, and more particularly to cleaning and detergent compositions for use on metal surfaces, particularly metal surfaces of the stainless steel or rustless iron type.

Among the objects of the present invention is included the production of cleaning and detergent compositions for use on metal surfaces, particularly stainless steel surfaces to clean them effectively without injury to the metal.

Other objects and advantages will appear from the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only, and not by way of limitation, since various changes may be made therein by those skilled in the art without departing from the scope and spirit of the present invention.

In accordance with the present invention, compositions are formulated which are uniquely suited to the cleaning of metal surfaces without injury thereto, particularly stainless steel and rustless iron metals. The wide development and use of stainless steel and similar alloys in railroad cars in more recent years has necessitated new types of cleaning and detergent compositions suitable for use on such surfaces. In use the metal surfaces accumulate dirt, grit, soot, grease, etc., in much the same manner as the old type wooden and steel cars that were covered with paint or other finish; and in addition the stainless steel and similar alloys develop an oxide or other coating due to the direct exposure of the metal to the atmosphere.

The compositions produced in accordance with the present invention are peculiarly adapted to the cleaning of such surfaces as the stainless steel and rustless iron alloys, particularly of railroad cars which develop peculiar surface accumulations in use. While the compositions set forth herein may, therefore, be employed for other purposes, including the cleaning of metal surfaces generally, they are specifically adapted to the cleaning of metal surfaces of articles of manufacture, and particularly railroad trains or cars having surfaces of rustless iron and stainless steel, and the latter is used to illustrate the present invention where unique problems arise.

In accordance with the present invention, a composition is utilized which is directly applied to the metal surfaces to remove surface accumulations thereon, while not materially affecting the metal surface itself, which latter must be protected against any possible injury.

In such composition an acid component is employed, acting as a detergent material which serves to remove or assists in removing the particular coating that forms on such stainless steel or rustless iron surface, which acid component is capable of removing any such undesired coating without substantial injury to the metal. As exemplary of the acid components to be employed for this purpose, phosphoric acid is particularly emphasized, since it effectively removes the surface accumulation without any injury to the underlying metal itself. Other acids, such as lactic, may be employed. Because of the unique character of phosphoric acid in such combinations, it represents the most desirable form of acid detergent material for utilization.

In addition to the acid component referred to above, there is desirably employed in the composition an extractive detergent, that is one which is effective as a solvent for fat or oil or grease. Further the detergent should have stabilizing effect on any emulsion in which it is employed, or at least should not undesirably affect the stability of the composition. Stable emulsions which do not segregate are more desirable. Generally the materials employed may be extractive detergents, or may be solvents as indicated, and there may be used in this connection halogenated hydrocarbons, including both aliphatic and aromatic derivatives, glycols and glycerols, including the polyglycols and polyglycerols, and the ethers of the glycols and glycerols and of the polyglycols and polyglycerols, organic oxides, ketones, etc. Orthodichlorobenzol is eminently suited for this purpose, and in combination with the phosphoric acid produces a detergent combination of peculiar importance in connection with rustless iron and stainless steel surfaces. Such orthodichlorobenzol may be utilized in the composition in relatively small amounts, while still exhibiting the desired properties. Methyl iso butyl ketone is also a desirable extractive detergent, not alone because of its detergent properties, but because it does not interfere with the stability of the emulsion on aging. Materials like orthodichlorobenzol and methyl iso butyl ketone (hexone) possess both the detergent properties and stabilization of the emulsion, or at least do not interfere with the stability of the emulsion produced. Sometimes the extractive employed may have better solvent action than it does stabilizing action in the emulsion. Thus carbon tetrachloride exhibits excellent solvent properties but only fair stability in the emulsion. Mesityl oxide shows good solvent properties, but mediocre

stability. Butyl alcohol and butyl carbitol show fair solvent action and fair stability in the resulting emulsions. Carbitol and butyl "Cellosolve" both show good stability in the emulsions, but their solvent properties in these compositions are not as satisfactory as some of the other stated ingredients. Ethylene glycol, ethylene glycol mono ethyl ether (Cellosolve), and trichlorethylene show fair stability in the emulsions, but their solvent action in these compositions is not generally as desirable as those of other stated ingredients. Amyl alcohol shows excellent stability in the emulsion, but low solvent action. Some of the materials, such as glycerol and methyl amyl ketone are both low in solvent action and in stability.

Combinations of the solvents or extractive detergents may also be made, so that if desired a combination may be employed of several ingredients, one to supply the desired solvent action, and the other the stabilizing properties.

The detergent materials including the acid and the extractive detergent are basic ingredients employed in the composition for use for the treatment of the particular alloys referred to above, and they are desirably employed in aqueous emulsions or suspensions. Together with such combination, there is desirably employed a mineral oil component, because of its blending power, and because it retards the drying of the composition enabling large quantities of the composition to be applied as a coating to the surface to be cleaned before the necessity of removing the composition arises. While various mineral oils and mineral oil distillates may be utilized as the mineral oil component for this purpose, desirably a non-blooming oil component is employed, which does not produce a bloom on the surface of the clean metal. Debloomed, neutral, light bodied mineral oil having a flash point of from 310° F. to 375° F. and a fire point between 355° F. and 420° F. may desirably be used.

Where the composition is utilized in the form of an emulsion, an emulsifying agent should desirably be present, and the water-soluble gums, such as gum tragacanth, may desirably be utilized in these compositions. In addition to serving as an emulsifying agent, the gum tragacanth increases the adhesion of the composition for the metal surface.

While the water-soluble gums, such as gum tragacanth, are more particularly emphasized as emulsifying agents to be used, other emulsifying agents may be referred to, but care should be exercised in their utilization in these compositions, so that the composition contains no material in any proportion which has an undesirable influence on the metal surface; and exemplifying such emulsifying agents mention may be made of the sulphated and sulphonated emulsifying or miscibilizing materials that are available on the market, among which may be noted the various sulphonated organic compounds, such as the sulphonated hydrocarbons, including naphthalene, sulphonated organic or glyceride oils, and sulphonated mineral oils, for example, sulphonated castor oil and Turkey red oil, sulphated alcohols, such as sodium, potassium, copper, etc., oleyl or stearyl, or lauryl, etc. sulphates; sulphated or sulphonated phenols, such as the products available on the market and known as "Aresco"; sulphonated naphthalene derivatives, such as "Nekals"; sulphonated fatty acid ester derivatives as, for example, "Emulphor A oil sol-

uble", or "Igepon A", which is the fatty acid ester of a sulphonated aliphatic compound, or "Igepon T", which is the fatty acid ester of a sulphonated amido compound. The sulphonated derivatives which are thus utilized as miscibilizing agents being generally acid in character also assist in the detergent action.

The following is exemplary of compositions that can be utilized in accordance with the present invention, the parts being by weight:

	Parts
Non-blooming mineral oil.....	12
Gum tragacanth.....	2
Orthodichlorbenzol.....	2
Phosphoric acid (50% solution diluted with water to a 10-20% solution).....	121

The proportions utilized may vary within substantial limits. For example, the non-blooming mineral oil may be used in proportions of 10 to 20 parts, the gum tragacanth 1 to 5 parts, the phosphoric acid solution 110 to 130 parts, and the orthodichlorbenzol 1 to 10 parts. These proportions, however, are not limiting, but the amount of the acid should not be undesirably increased, nor is it necessary to use excessive amounts of the orthodichlorbenzol as the detergent.

Any desired way may be utilized in combining the components. The following may be utilized. The emulsifying agent, such as gum tragacanth, is dissolved in the acid solution, and the oil then added and thoroughly emulsified by vigorous agitation. The orthodichlorbenzol is then introduced into the composition.

The application of such compositions as that set forth above to a metal surface, such as stainless steel or rustless iron, readily removes the dirt, grease and other accumulations that gather on railroad cars or similar surfaces, without injury to the metal surface itself. The compositions may be applied in any desired way, and promptly remove the undesired surface accumulations.

The preferred compositions produced in accordance with the present invention are those in which the components are combined into a material which after application to the surface to be cleaned, does not manifest any breaking of the emulsion. In the preferred form of the compositions utilized in accordance with the present invention as illustrated in the formula given above, the emulsion does not break, but remains wet on the metal, enabling it to perform its desired function in a most efficacious manner.

While the cleaning compositions are desirably employed in the form of aqueous emulsions or dispersions, the various ingredients may be made up in a non-aqueous or substantially non-aqueous form as a concentrate to be shipped as such to the point of use. Thus the composition of the indicated formulation may be prepared by admixture of the stated ingredients without, however, including any water in the composition, other than that which is present in the phosphoric acid, and such mixture of materials shipped as a concentrate to be emulsified with the necessary quantity of water at the time and place of use. Or part of the water may be included in the composition to give a concentrate in emulsified condition, which may be similarly employed upon dilution with some added water.

Having thus set forth my invention, I claim:

1. A cleaning composition for stainless steel and rustless iron surfaces containing phosphoric acid and an extractive detergent selected from

the group consisting of orthodichlorbenzol and methyl iso butyl ketone.

2. A cleaning composition for stainless steel and rustless iron surfaces containing phosphoric acid and orthodichlorbenzol.

3. A cleaning composition for stainless steel and rustless iron surfaces consisting of an aqueous emulsion of phosphoric acid and orthodichlorbenzol.

4. A cleaning composition for use on stainless steel and rustless iron surfaces containing phosphoric acid, orthodichlorbenzol, and a non-blooming mineral oil.

5. A cleaning composition for use on stainless steel and rustless iron surfaces containing phosphoric acid, orthodichlorbenzol, a mineral oil component, and an emulsifying agent.

6. A cleaning composition for stainless steel and rustless iron surfaces containing an aqueous emulsion of phosphoric acid, orthodichlorbenzol, a mineral oil component, and an emulsifying agent.

7. A cleaning composition for stainless steel and rustless iron surfaces comprising an aqueous emulsion containing by weight 121 parts of phosphoric acid (50% solution diluted with water to 10-20%), 2 parts orthodichlorbenzol, 12 parts non-blooming mineral oil, and 2 parts gum tragacanth per gallon of composition.

8. The method of making cleaning compositions for stainless steel and rustless iron surfaces which comprises emulsifying phosphoric acid and orthodichlorbenzol in an aqueous medium containing an emulsifying agent.

9. The method of making cleaning compositions for stainless steel and rustless iron surfaces which comprises emulsifying phosphoric acid, orthodichlorbenzol and a mineral oil component in an aqueous medium in the presence of an emulsifying agent.

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