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METAL PROTECTING PREPARATIONS

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13 Claims 10

This invention is for improvements in or relating to metal protecting preparations and is concerned more particularly with a metal treating preparation which incorporates a medium by which a cleaned metal surface is protected so as to retain its cleaned state for a prolonged period. The invention is particularly concerned with preparations for cleaning metal surfaces containing silver, copper or nickel, and has for one of its objects to provide an effective preparation which is capable of being prepared in a simple manner and incorporates relatively inexpensive ingredients.

A preparation for polishing silver has already been proposed which comprises a mild abrasive and an anti-tarnish agent, with the latter constituted by a mercaptan consisting of a straight chain alkyl primary thiol containing 12 to 20 carbon atoms. Such a preparation when used for cleaning and polishing silver causes an invisible protective coating to be formed on the cleaned metal surface which confers substantial protection against tarnishing as long as the coating remains intact reducing the frequency with which the silver requires to be cleaned. The anti-tarnishing component of the previously proposed preparation is in some respects lacking in desirable properties and the invention seeks to produce a metal treating preparation which employs as its protective ingredient a medium which besides being economical in cost offers the advantages of low toxicity, great stability resulting in a durable protection for the metal, and having a less objectionable odor than the mercaptan of the previous proposal.

In accordance with the invention in one form there is provided a cleaning or polishing preparation for metal surfaces containing silver, copper or nickel, comprising a cleaning or polishing medium in admixture with a protective medium consisting of an ester of a mercapto carboxylic acid. It is found that such a preparation is very effective in use and relatively economical to produce besides offering other advantages referred to herein.

The protective medium may be admixed with a cleaning medium consisting of a physically acting abrasive or one consisting of or comprising a chemically reactive tarnish remover. The cleaning or polishing preparation may take the form of a liquid preparation adapted for application in the manner of a metal polish or a complex forming detarnishing solution or it may be in the form of a paste or cream. Further if desired the cleaning or polishing preparation may be provided in the form of a powder or a semi-solid block suitable for application to a buffing wheel, or it may be impregnated into fiber, fabric or braid normally used for cleaning or polishing operations being held therein either as a powder or as a semi-solid.

The invention also comprises a metal treating preparation for acting on metal surfaces containing silver, copper or nickel comprising a surface treating medium in admixture with a protective medium consisting of an ester of a mercapto carboxylic acid. Such metal treating preparation may consist of a pickling, detarnishing, brightening, de-scaling or etching bath. Thus by the incorporation of the protective medium any such bath may be caused to have tarnish inhibiting properties.

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The invention further comprises a metal treating liquid protective preparation suitable for addition to a treatment bath for acting on surfaces containing silver, copper or nickel to impart tarnish inhibiting properties, such preparation consisting of a solution in an organic solvent of an ester of a mercapto carboxylic acid.

In practising the invention the substance used to form the protective medium may be any ester of a mercapto carboxylic acid within an appropriate range of such esters. The general formula for such an ester is



where R is a group derived from an alcohol of the general form $\text{C}_n\text{H}_{2n+1}\text{OH}$ (aliphatic alcohol) or one derived from an aromatic phenol or aromatic alcohol or from a glycol. The most effective ones of the compounds in which R is derived from an aliphatic alcohol are those having from 8 to 22 carbon atoms in the group R. One such compound found to be particularly useful is stearyl thioglycollate.

Particular examples illustrating how the invention can be carried into effect will now be given, the proportions of the constituents indicated being reckoned by weight.

EXAMPLE 1

A liquid polishing preparation suitable for use on surfaces containing silver, copper or nickel contains the following substances in admixture:

Polishing powder	Percent
for example diatomaceous earth	20
Ethyl alcohol	20
Stearyl thioglycollate	2.5
Phosphoric acid (as stabiliser) approx.	0.2
Water up to 100%.	

In preparing the preparation according to this example the stearyl thioglycollate is melted and heated to a temperature of approximately 100° C. and is then added to the alcohol. Sufficient of the polishing powder is then added with vigorous stirring until a fairly viscous mixture is obtained. Continuous stirring with a high shear action some water is added and then alternate additions of polishing powder and water are made until the mixture is complete. The resultant mixture has a dispersion of thioglycollate on the surface of the polishing powder which is in turn homogeneously dispersed in the aqueous alcoholic liquid. The phosphoric acid is then stirred homogeneously into the mixture which is thereupon ready for bottling. Advantageously, to improve the stability of the suspension, bentonite may be incorporated in the proportion of about 2 to 4% by weight. The bentonite may be incorporated by forming it to a gel with part of the water. This gel may be added to the viscous mixture aforesaid before the addition of water thereto.

Acids other than phosphoric acid (for example acetic acid or hydrochloric acid) may be used in place of phosphoric acid to form a stabiliser, although phosphoric acid is preferred for this purpose. The stabilising effect is employed to prolong the shelf life of the liquid product.

EXAMPLE 2

A polishing paste for metal surfaces as aforesaid is made up as follows:

	Percent
Polishing powder	20
Detergent paste	40
Stearyl mercapto-propionate	2.5
Phosphoric acid (as stabiliser) approx.	0.2
Water up to 100%.	

In preparing the paste the mercapto-propionate is first warmed with an equal weight of detergent paste and the

resulting liquid is added to the dry ingredients whilst being stirred. The formation of the stiff paste ensures homogenising of the final product. Afterwards the liquid content is added slowly whilst the mixture is stirred.

EXAMPLE 3

An emulsion polish for metal surfaces as aforesaid is made up from the following ingredients:

	Parts
Stearyl thioglycollate -----	3
Diatomaceous earth -----	15
Hydrocarbon solvent -----	30
Anionic surfactant (surface active agent) for example sodium alkyl benzene sulphonate -----	8
Water -----	44
Phosphoric acid -----	0.2

The emulsion polish is prepared substantially as in the Example 1 above.

EXAMPLE 4

A solvent based paste polish (as opposed to a water based paste polish such as in Example 2) is made up from the following ingredients:

	Percent
Stearyl thioglycollate -----	3
Diatomaceous earth -----	15
Alcohol -----	4
Hydrocarbon solvent -----	66
Gelling agent -----	12

The stearyl thioglycollate is dissolved in the hydrocarbon solvent together with the gelling agent and thoroughly mixed. The alcohol is then added and homogeneously mixed. Finally the diatomaceous earth is stirred into the mixture.

EXAMPLE 5

A cleaning and polishing powder for use on metal surfaces as aforesaid comprises the following:

	Grams
Polishing powder e.g. kieselguhr, aluminum oxide --	98
Stearyl thioglycollate -----	62

These constituents are thoroughly blended by grinding. The resulting preparation may be used as such or may be incorporated into a suitable polishing cloth or braid etc.

EXAMPLE 6

A liquid protective preparation which may be added in a small proportion to a pickling, detarnishing, brightening, de-scaling or etching bath for acting on surfaces containing silver, copper or nickel, to impart tarnish inhibiting properties is formed by dissolving stearyl thioglycollate in isopropyl alcohol in the proportion of 2.5% by weight.

EXAMPLE 7

An emulsion type dipping solution being a protective preparation suitable for treating metal surfaces as above mentioned by immersion therein or for adding in a small proportion to various kinds of baths as in Example 6 is made up of the following constituents:

	Parts
Stearyl thioglycollate -----	3
Ethoxylated fatty alcohol (fatty alcohol/ethylene oxide condensate) -----	3
Phosphoric acid -----	0.2
Water -----	94

EXAMPLE 8

A dipping solution of organic solvent type suitable for use in similar manner to Examples 6 and 7 is prepared by dissolving stearyl thioglycollate in a hydrocarbon solvent in the proportion of 2% thioglycollate to 98% solvent.

EXAMPLE 9

A solid polishing composition suitable for mechanical application comprises the following:

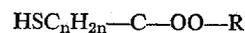
	Parts
5 Higher fatty acid (e.g. stearic acid) -----	19
Microcrystalline wax -----	8
Triethanolamine -----	1
Polishing powder, e.g. tripoli powder -----	80
10 Lauryl thioglycollate -----	12

What we claim is:

1. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

2. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel and which contains an abrasive, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

3. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel and which contains a tarnish remover, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula



wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

4. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel and which contains a pickling, detarnishing, brightening, descaling or etching agent, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

5. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel in cream form, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

6. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel in powder form, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

7. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel in liquid form, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

8. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel in paste form, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

9. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or

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nickel in semi-solid block form, the improvement which comprises the addition of an ester of a mercapto carboxylic acid of the formula $\text{HSC}_n\text{H}_{2n}-\text{C}-\text{OO}-\text{R}$ wherein n is 1 or 2 and R is $\text{C}_n\text{H}_{2n+1}$ wherein n is 8 to 22, in an amount sufficient to protect the metal surface against tarnishing.

10. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel, the improvement which comprises the addition of stearyl thioglycollate in an amount sufficient to protect the metal surface against tarnishing.

11. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel, the improvement which comprises the addition of stearyl mercapto propionate in an amount sufficient to protect the metal surface against tarnishing.

12. In a cleaning, polishing or coating composition for protecting metal surfaces containing silver, copper or nickel, the improvement which comprises the addition of lauryl thioglycollate in an amount sufficient to protect the metal surface against tarnishing.

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13. In a cleaning, polishing or coating composition for treating silver surfaces, the improvement which consists in the inclusion of a proportion of the octadecyl ester of a thiocarboxylic acid having the formula:



wherein n is 1 or 2, sufficient to inhibit tarnishing of the silver.

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