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RUST-REMOVING COMPOSITION FOR METALS.

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To all whom it may concern:

Be it known that I, JAMES H. GRAVELL, a citizen of the United States, residing at Elkins Park, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Rust-Removing Compositions for Metals, of which the following is a specification.

This invention relates to rust removing and preventing compounds generally, and especially to those compounds which are used for preparing metal for painting.

One object of the invention is to provide a compound that will efficiently remove rust and will neutralize or destroy those agencies which cause rust, such as hand marks, acid runs and soldering solutions. Another object of the invention is to provide a material which will remain wet or liquid after being placed on the surface to be cleaned for sufficient time for enabling it to complete its work.

It is now well known that acids are very satisfactory for removing rust and that phosphoric acid, owing to the ease of securing it commercially, is especially useful for that purpose.

To use these acids for cleaning metal, they are diluted with a solvent to the proper strength and are applied directly to the surface to be cleaned by dipping, spraying or brushing.

In practice it is found that the solvent evaporates or that the compound dries long before the chemical activity of the acid is exhausted with the result that all cleaning action stops and repeated applications of the diluted acid must be resorted to in order to properly clean the surface.

I have discovered that the addition of sodium in proper quantities to the acid solution causes it to remain liquid or wet for a substantially longer period, so that a single application of the acid solution is in many cases all that is required.

In order to make my cleaner I may use:

	Pounds.
85% phosphoric acid	100
Metallic sodium	4

This may be termed my "prepared acid."

To make up a cleaning solution I may use:

	Gallons.
Prepared acid	21
Water	55

This solution works very satisfactorily on work that is free from oil, but is not effective where oil is present. In order to make the material effective on an oily surface I add an ingredient adapted to lower the surface tension of the compound, such as alcohol, acetone or ethyl acetate, as follows:

	Gallons.
Prepared acid	21
Water	55
Alcohol, ethyl or its equivalent	19

The oil removing properties of the compound may be further improved by the addition of fusel oil or any of the components of fusel oil, such as butyl alcohol, as follows:

	Gallons.
Prepared acid	21
Water	55
Alcohol, ethyl or its equivalent	19
Butyl alcohol	5

It will be evident to those skilled in the art that the metallic sodium may be replaced by chemical equivalents such as mono-, di-, or tri-sodium phosphates. I have found that the sodium may be replaced by potassium, or magnesium or in fact by any metal whose phosphoric acid salts when dissolved in phosphoric acid are not precipitated by the addition of alcohol.

In the claims the term "phosphoric acid" includes any metal etching acid whose iron salts are insoluble in water and the term "sodium" includes any metal which dissolved in the acid will not be precipitated by the addition of alcohol and which has the property of keeping the composition liquid or wet.

It is within the scope of the invention to produce my "prepared acid" by the action of an acid on material containing sodium so that the sodium phosphate will be automatically produced in association with the metal etching acid, in other words, sodium content of the finished "prepared acid" may be

taken care of in the manufacturing of the basic acid.

I claim:

1. A cleaning agent for metals comprising free phosphoric acid, water and mono-sodium phosphate, substantially as described.

2. A cleaning agent for metals comprising free phosphoric acid, water, alcohol and mono-sodium phosphate, substantially as described.

3. A cleaning agent for metals comprising free phosphoric acid, water, ethyl alcohol, butyl alcohol and mono-sodium phosphate, substantially as described.

JAMES H. GRAVELL.