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IMPROVEMENTS IN OR RELATING TO PROCESS FOR PREPARING RUST AND SCALE REMOVING JELLY

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, Rafi Marg, New Delhi-1, India, an Indian registered body incorporated under the Registration of Societies Act (Act XXI of 1860).

The following specification particularly describes and ascertains the nature of this invention and the manner in which it is to be performed:—

Ths is an invention by KUMMATTITHIDAL SANTHANAM RAJAGOPALAN, Scientist and CHAKRAVARTHI RAJAGOPAL, Senior Scientific Assistant, both of the Central Electrochemical Research Institute, Karaikudi-3, India, both Indian citizens.

This invention relates to Improvements in or relating to process for preparing Rust and Scale Removing Jelly.

Hitherto it has been proposed that rust and scale can be removed by mechanical methods like wire brushing, sand blasting or shotblasting and by chemical methods such as pickling. It has also been proposed earlier by the inventors of this Patent that the rust and scale can be removed by application of a derusting jelly (Indian Patent 106114).

Rust and scale removing jelly to Indian Patent No. 106114 removed thin scale and rust but it was open to the objection that even after 24 hours thick scale was not removed by this jelly.

The object of this invention is to eliminate the above said drawbacks.

We have found that the addition of an inorganic reducing agent such as stannous chloride, potassium ferrocyanide or an organic reducing agent such as di-aldehyde starch, p-aminophenol to a solution of hydrochloric acid containing glycerol, cellosol, root flour, gives a viscous solution which can remove thick rust of the type which cannot be removed by composition described in Indian Patent No. 106114.

The advantage of the invention is that thick rust which cannot be removed by composition described in product to Indian Patent No. 106114 can be removed and the new formulation contains an additional chemical namely a reducing agent, which helps in removing thick scale and rust quickly and also leaves a bright surface.

The characteristics required are:—

(a) the active substance remains in contact with the metal surface for a period required to remove rust and scale,

(b) it does not run off the surface on application and

(c) the jelly can be washed off the surface with water before painting.

According to the present invention, there is provided a process for preparing rust and scale removing jelly which consists in (i) adding a reducing agent consisting of (a) an inorganic reducing agent such as stannous chloride or potassium ferro-cyanide or (b) an organic reducing agent such as p-aminophenol, dialdehyde starch to hydrochloric acid and heating to 70-80C° till the substance is completely dissolved, (ii) adding and thoroughly mixing with this hot solution, a thickener such as root flour (tapioca), starch, bentonite and a fungicide such as p-nitrophenol with constant stirring to obtain a viscous like substance followed by (iii) cooling to form a jelly.

The proportion of the ingredients is as follows:—

Hydrochloric acid	— 30— 53%	by Weight
Fungicide (p-nitrophenol)	— 1— 3%	-do-
Reducing agent	— 1— 5%	-do-
Thickener (root flour) (topioca)	— 30— 50%	-do-

The invention makes it possible to reomve very thick rust up to 200 gms/metre square by repeated applications.

The rust and scale removing jelly composition prepared by the process of this invention is not merely admixture resulting in the aggregation of properties of the components thereof.

Example 1

5 grams of Stannous chloride is dissolved in 100 c.cs of concentrated hydrochloric acid and the whole solution is heated to about 50°C. Then, 50 grams of root flour (tapioca) and 0.5 grams of fungicide (p-nitrophenol) are added to the hot solution with constant stirring till a viscous like substance is obtained. The substance is then cooled to form a gel.

Example 2

10 grams of potassium ferrocyanide is first dissolved in 50 c.c. water and then added to 150 c.c. of Hydrochloric acid (concentrated). This solution is heated to about 50°C and then 100 grams of Root-flour and 1 gram of fungicide (p-nitrophenol) are added and stirred together. This substance on cooling becomes a brushable gel.

Example 3

8 grams of p-aminophenol and 1 gram of fungicide (p-nitrophenol) are added to 200 c.c. concentrated hydrochloric acid and heated till the substance is completely dissolved. The solution is then cooled and 48 c.cs of glycerol and 40 grams of root flour are added till a viscous substance of brushable consistency is obtained.

Example 4

5 grams of stannous chloride and 5 grams of potassium ferro-cyanide are added to 200 c.c. of concentrated hydrochloric acid and then the whole solution is heated to about 50°C. and then 100 grams of Root flour and 1 gram of fungicide (p-nitrophenol) are added till a pasty mass is obtained. This substance becomes a jelly on cooling at room temperature.

The performance of the derusting jellies developed by us is given below in comparison with a solution of hydrochloric acid and Indian Patent No. 106114.

Procedure:

Heavily rusted steel is brushed with jelly in the vertical position and the surface is examined at the end of 60 minutes and again at 120 minutes. If the removal of rust is not complete, the third application is given (after wiping off the previous coatings with wet waste cloth) and left over night and washed after 24 hours.

TABLE 1

Time taken for the removal of thin and thick rust.

Product to Example No.	Type of jelly	Thin rust	Thick rust
1.	Conc. Hydrochloric acid	Evaporates within minutes (here and there rust is removed).	Evaporates within minutes (rust is not removed).
2.	Rust and Scale removing jelly described in Indian Patent No. 106114.	Less than 15 minutes.	Not removed.
3.	Rust and Scale removing jelly. Example 1	Less than 10 minutes.	Partially removed. 50 to 60% of the rust is removed.
4.	Example 2	-do-	
5.	Example 3	-do-	Removal is complete and satisfactory.
6.	Example 4	-do-	50 to 60 % of the rust is remove

TABLE 2

Presence of jelly on the surface of the metal for as long as 24 hours is illustrated in the example cited below:

Description of test.	HCl	Jellies Examples 1 to 4
Rusted steel, brushed in the vertical position and left over night and examined for presence of rust remover.	Evaporates.	Remains intact on the surface.

Cost of jelly:—

Example 1	—Rs. 2.56	per litre as per prevailing rates.
Example 2	—Rs. 1.60	
Example 3	—Rs. 2.70	
Example 4	—Rs. 2.10	

We claim:

1. A process for preparing rust and scale removing jelly which consists in (i) adding a reducing agent consisting of (a) an inorganic reducing agent such as stannous chloride or potassium ferro-cyanide or (b) an organic reducing agent such as p-aminophenol, dialdehyde starch to hydrochloric acid and heating to 70-80°C till the substance is completely dissolved, (ii) adding and thoroughly mixing with this hot solution, a thickener such as root flour (tapioca), starch, bentonite and a fungicide such as p-nitrophenol with constant stirring to obtain a viscous like substance followed by (iii) cooling to form a jelly.

2. A process as claimed in claim 1 wherein the proportion of the ingredients is as follows:—

Hydrochloric acid	— 30—50	by Weight
Fungicide (p-nitrophenol)	— 1—3%	-do-
Reducing agent	— 1—5%	-do-
Thickener (root flour) (tapioca)	— 30—50%	-do-

3. A process for preparing a rust and scale removing jelly substantially as herein before described with reference to the examples.

Dated this 24th day of February, 1973.

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