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PROCESS FOR LOOSENING A CORROSION FROZEN METAL-TO-METAL JOINT

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6 Claims. (Cl. 204—145)

This invention relates to a process for separating or degreasing and separating the component parts of metal articles such as machines or parts thereof which have become cemented together by corrosion and is particularly applicable to the salvage of machinery and machinery parts which have become rusted up as a result of exposure to the weather and disuse following war damage. Machinery damaged in this way often becomes scrap metal chiefly because parts in contact, particularly co-operating relatively moving parts like male and female screws and sliding parts become cemented together with rust and cannot be freed without damage.

The present invention provides a simple process whereby such machinery and machinery parts particularly iron and steel parts can be restored and separated without exterior dismantling or complete dismantling thus salvaging much needed machinery without much labour and putting into immediate use, e. g., for war purposes material which would otherwise be scrap metal.

According to the invention articles such as machines or parts thereof which consist of a plurality of members which have become cemented together by corrosion are separated by connecting said parts to form a terminal of an electrolytic circuit in an alkaline bath.

Various processes have been proposed hitherto for cleaning and degreasing or removing rust from iron and steel and other metal articles involving treatment at the anode or cathode in an alkaline electrolytic bath but there is nothing in these prior published proposals to suggest that, for instance, male and female screws and sliding parts which have become seized up and cemented together could be freed by the same treatment and it is a surprising discovery that this should be so in that electroplating experience would tend to suggest that electrolytic action is more or less confined to surfaces freely exposed to the electrolyte.

Conveniently where the machine or machine part consists of a plurality of contacting members such as screws and sliding parts which will have a layer of rust or other corrosion product between the parts normally in contact, each separate part is wired up to the electrode terminal so that there may be a multiplicity of connections to various parts of a machine. The other electrode may be any conductor not affected by anodic or cathodic action as the case may be in an alkaline electrolyte. Conveniently a bar slab or the like of iron or mild steel may be used either at the anode or the cathode or alternatively another rusted up machine part may form the other electrode.

It is believed that when the separation takes place at the cathode the action is partly mechanical due to the loosening action of bubbles of hydrogen formed at the surface of the metal immediately under the surface rust, but possibly some electro reduction of metallic oxide and carbonate if present takes place and the resulting shrinkage will assist the loosening and removal of the rust film. However this may be it has been found that the process according to the invention has the effect of separating and restoring the machine parts and although there may be evidence of pitting the parts are restored practically to their original condition with very little expenditure of labour, time or material.

It is not desired to rely upon any theory as to what exactly occurs at either terminal but at the anode there appears to be to some extent a degreasing action which may be due in some measure to electro-osmosis and possibly also to oxidation. At any rate where a machine part such as a bearing which has become rusted up has still a certain amount of oil in between the surfaces which have become cemented up, it may not be possible to free it by treatment immediately at the cathode owing to surface tension difficulties preventing any entry of the electrolyte. In such cases it has been found possible to free the parts either by treatment at the anode alone or by such treatment followed by treatment at the cathode. This may be easily effected by simply reversing the connections to the electrodes.

A suitable current density for treatment of iron or steel articles at the cathode has been found to be 40 amps. per square ft. of cathode surface and the time required for this treatment may be from about three hours to three days according to size and condition.

Any alkaline electrolyte may be employed but in order that the electrolyte may penetrate into the affected parts which may be greasy in places, it is desirable to use an alkaline solution which also contains agents capable of dispersing grease. For this purpose any alkaline cleaning composition such as is used for cleaning before plating may be used. Alternatively the machinery or parts thereof may be submitted to a preliminary degreasing treatment prior to electrolysis.

The concentration of the electrolyte will obviously be adjusted to give the desired conductivity to the solution.

After the electrolytic treatment the parts or the

machine are rinsed or immersed in hot water and dried.

The aforesaid method of degreasing and separating is very advantageous for treating rusted-up parts and especially relatively movable parts where it is difficult to obtain access to the crevices containing the grease and where the electrolytic de-rusting treatment would be hindered by the presence of the grease.

Although the process has been more particularly described with reference to treating iron and steel articles it will be appreciated that it is equally applicable to treating other articles of other metals such as brass or copper which have become cemented together by corrosion.

What I claim is:

1. A process of loosening a corrosion frozen metal-to-metal joint between normally cooperating movable members which comprises connecting each of the members to one terminal of a source of direct current, placing the joint in an alkaline electrolyte and passing a current between the joint and another electrode in contact with the electrolyte and connected to the other terminal of the source of current for a period of time sufficient to loosen the joint.

2. A process as in claim 1 wherein the jointed metals are ferrous.

3. A process as in claim 1 wherein the jointed metals are ferrous and are connected to form cathodes and wherein the current density is approximately 40 amp. per square foot of cathode surface.

4. A process as in claim 1 wherein there is also present in the electrolyte a reagent capable of dispersing grease.

5. A process as in claim 1 wherein the current passed is first passed in a direction making the joint anodes and afterwards reversed making the joint cathodes.

6. A process of loosening a corrosion frozen metal-to-metal joint between two normally cooperating relatively movable members which comprises making each of the two members an individual cathode in an alkaline electrolyte and passing a direct current from an anode in said electrolyte to said individual cathodes in a divided path for a period of time sufficient to loosen the joint.

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