METHOD OF REMOVING A PHOSPHATE COATING FROM A SURFACE

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No Drawing. Application November 1, 1937, Serial No. 172,150

10 Claims. (Cl. 148—8)

UNITED STATES PATENT OFFICE

2,159,261

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This invention relates to a cleaning method and more particularly to a method of removing a phosphate coating from a surface coated therewith.

Surfaces of metals, such as iron, steel, zinc or magnesium or their alloys, for example, are frequently coated with substantially insoluble phosphates in order to retard corrosion and/or to provide a surface to which paint will readily adhere. A suitable solution for this purpose is made in accordance with the teaching of Robert R. Tanner and Herman Johan Lodee, in Patent No. 1,949,090, dated February 24, 1934. Other suitable solutions for providing satisfactory phosphate coatings on various surfaces are old and well known.

In some instances, it may be desirable to remove all or a portion of the phosphate coating from the surface having the coating applied thereto. Also, the equipment used in the coating process may become covered with a phosphate coating, which, for various reasons, it may be desirable to remove. I have found that phosphate coatings may be readily removed from surfaces coated therewith by subjecting the coated surfaces to the action of fused or molten cyanide.

In the treatment of metal surfaces with phosphate coatings for the prevention of corrosion and/or to provide a surface to which paint will adhere readily it has been found that the coating solution, for example, the solution taught in the above mentioned Tanner and Lodee patent, may advantageously be applied by means of spray nozzles which apply the solution under pressure to the work. These nozzles usually have rather small passages and the inner surfaces thereof become coated after being in service for a time. Eventually the nozzle becomes substantially "clogged-up" and it is necessary to remove the coating in order that the nozzle function in the desired manner.

In apparatus for satisfactorily carrying out the spray process a rather large number of nozzles of small size are generally required. Previous to my invention, it has been common practice to remove the several nozzles from the spray pipes and to scrape and/or ream the spray chambers and passages in order to remove the phosphate coatings. This is a tedious procedure and involves a considerable amount of labor in order to place the nozzles in condition for further service. I have found that the nozzles, which preferably are formed of stainless steel, may have the phosphate coatings readily removed therefrom by subjecting the coated surfaces to the action of fused or molten cyanide. This obviates a large part of the labor previously required and greatly reduces the time of cleaning the nozzles. It has also been noted that after several treatments in the fused cyanide that the nozzles form as rapidly as before, and that the coating or scale is not as tightly adherent.

It will be appreciated that the time of removing the coatings by the previously known method of scraping will vary with the size of the chambers and openings in the nozzle, etc. In one spraying apparatus utilizing 260 nozzles of a certain size it takes about twelve to sixteen hours by the scraping process to remove the phosphate coatings and place the nozzles in condition for further use. By the use of my process the same number of nozzles of the same size can be suitably cleaned in about ten minutes.

Accordingly, one object of my invention is to provide a new and improved method of removing phosphate coatings from surfaces coated therewith.

Another object is to provide a method of removing phosphate coatings from metal surfaces coated therewith in which the time and labor involved are greatly reduced over methods heretofore used.

It is also an object of my invention to treat stainless steel spray nozzles to reduce the tendency of phosphate coatings to adhere thereto.

A specific object of my invention is to provide a new method of removing phosphate coatings from the surfaces of spray nozzles, particularly the inner surface of spray nozzles formed of stainless steel.

Other objects and advantages of my invention will become more apparent as the description proceeds.

As a specific example of my process, I will describe the same in connection with the removal of phosphate coatings from the inner surfaces of stainless steel spray nozzles used to spray phosphate coatings on metal surfaces to retard corrosion thereof. The nozzles are first removed or uncoupled from the spray pipes and given a treatment to remove all water or moisture from the surface thereof. For this purpose, the nozzles may be preheated to approximately 300° F. until the water is removed. They are then placed in a ladle or basket and carefully immersed in molten or fused sodium cyanide at a temperature of approximately 1420° F. for a period of about one minute.

When the coated nozzles are immersed in the molten cyanide a great deal of chemical reaction
takes place as evidenced by violent boiling. This reaction is substantially completed at the end of one minute. The time of treatment in the fused cyanide will, of course, vary somewhat with the thickness of the coating, size of the parts, size of the passages therein, etc. When the reaction is substantially completed the nozzles are removed and dumped in cold water. They are then ready to be used in service once more. A slight amount of loose smut may be present in the chambers and passages in the nozzle after the treatment but no large scaly particles are present.

A cyanide pot as commonly used in the heat treatment of metals, such as steel, may be employed in carrying out my process. The usual precautions of experienced heat treat operators should be taken. The operator should wear goggles, or preferably a welding helmet with clear glass. Gloves should be worn, also. The cyanide pot preferably is covered with a casing, of sheet metal for example, having an opening just large enough to permit the basket to readily pass therethrough.

It will be understood that while I prefer to use fused sodium cyanide, other fused cyanides may be used; for example, potassium, etc. Also, while in the specific example spray nozzles of stainless steel are described, it will be understood that other articles and materials may have phosphate coatings removed from their surfaces by my process.

I claim:

1. The method of removing a phosphate coating from a surface which comprises, subjecting the coated surface to the action of molten cyanide.
2. The method of cleaning a metallic surface having a phosphate coating thereon which comprises, immersing the coated surface in a bath of fused cyanide until the coating is substantially removed.
3. A method as in claim 2, in which the surface is of stainless steel and the bath is fused sodium cyanide at a temperature of about 1420° F.
4. The method of cleaning a spray nozzle having a phosphate coating on an inner surface thereof which comprises, immersing the nozzle in a bath of fused cyanide until the coating is substantially removed.
5. A method as in claim 4, in which the bath is fused sodium cyanide at a temperature of about 1420° F.
6. A method as in claim 4, in which the nozzle is of stainless steel and the bath is fused sodium cyanide.
7. A method as in claim 4, in which the nozzle is preheated to approximately 300° F. before immersion in the fused cyanide.
8. A method of treating a stainless steel spray nozzle to reduce the tendency of a phosphate coating to adhere thereto which comprises subjecting the spray nozzle to the action of fused cyanide.
9. A method as in claim 2, which includes the additional step of rapidly quenching in a cooling medium.
10. A method as in claim 4, which includes the additional step of rapidly quenching in a cooling medium.

ROLLIE P. DURHAM.