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SANDBLASTING PROCESS

Herbert J. Krase, Dayton, Ohio, assignor to
Monsanto Chemical Company, a corporation of
Delaware

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This invention relates to a process of treating metals by the impact of small particles or shots of ferrophosphorus.

An object of this invention is the provision of a process whereby metals generally and particularly ferrous metals such as iron and steel may be cleaned, and the surface thereof treated to impart corrosion resisting properties.

It has already been proposed to sand blast iron or steel surfaces by means of combinations of sand and acid phosphates, particularly sodium acid phosphate. Such acid salts of phosphoric acid, however, are relatively soft and usually due to the blasting action of the sand are rapidly disintegrated to relatively small particles which are lost as dust from the sand blasted surface. They are moreover soluble and may readily be removed from the surface treated therewith.

I have now found that if ferrophosphorus be finely divided, which may be done by crushing or grinding that the particles of ferrophosphorus have very sharp edges and that these sharp edges are maintained and renewed during use. The finely ground or crushed ferrophosphorus may, according to my invention, be introduced into a stream of air moving at high velocity and projected against the metal surfaces to be cleaned. I have found that the ferrophosphorus being brittle tends to somewhat penetrate the surface of the material being cleaned which penetration may be of molecular dimensions and that minor amounts of the ferrophosphorus remain imbedded in or adhere to the iron or steel or other metal surface.

The ferrophosphorus employed in my invention may be the ordinary blast furnace type of metal known commonly as "low" metal which has a phosphorus content in the neighborhood of 17% to 18%, or it may constitute the "high" metal as produced in the electric furnace. The "high" metal normally runs from 22% to 25% or 26% or more in phosphorus, or it may constitute alloys of intermediate composition. In general I prefer to employ the so-called "high" metal, because it is somewhat more brittle and harder. Also associated with the phosphorus are minor proportions of silicon and manganese, the silicon running from a fraction of a per cent to as much as 2 or 3%, and the manganese running from 1% to 2%.

Of the various metals which may be treated by my process I may say that generally any metal from which it is desired to remove dirty or corroded surface coatings such as rust, grease, paint, etc., may be treated by my invention. The finely divided ferrophosphorus may be suspended in a rapidly moving stream of air as in ordinary sand blasting operations or it may be projected

by means of mechanical devices which are now commonly employed in this art. For the purpose of this invention the ferrophosphorus may be subdivided into any reasonable size as may be suitable for the particular device used for sand blasting. In general, however, where the material is to be suspended in an air stream the metal should be crushed or ground to a size of from 4 mesh to about 20 mesh.

Treatment of iron or steel surfaces may generally be carried out at ordinary temperatures, however, for certain purposes, where it is desired to accelerate the penetration of ferrophosphorus into the iron, it may be desirable to heat the metal, and also the ferrophosphorus particles in any suitable manner and then carry out the sand blasting at elevated temperatures. The temperatures may range upwardly to as high as 500° C. to 600° C. or even higher, and may desirably include the critical temperature range of iron.

In general the finely divided ferrophosphorus is preferably employed as such as a sand blasting abrasive, however it may for certain purposes be mixed with other metallic and non-metallic abrasives, for the purpose of obtaining special effects.

What I claim is:

1. The process of treating metal surfaces which are susceptible to rusting, comprising projecting upon said surfaces finely divided particles of ferrophosphorus at such a velocity that said surfaces are simultaneously cleaned and rendered rust resistant.
2. The process defined in claim 1 in which the ferrophosphorus employed contains from 22 to 26% of phosphorus.
3. The process of treating iron surfaces which are susceptible to rusting, comprising projecting finely divided particles of ferrophosphorus at high velocity upon said surfaces whereby said surfaces are cleaned and rendered rust resistant in a single operation.
4. The process defined in claim 3 in which the iron surfaces treated are maintained at an elevated temperature.
5. The process defined in claim 3 in which the iron surfaces treated are maintained within the critical temperature range of iron.
6. The process defined in claim 3 in which the particles of ferrophosphorus are heated to a temperature range of approximately 500° C. to 600° C.
7. As a material for simultaneously cleaning and rust proofing metal surfaces, a "sand blasting" sand comprising finely divided ferrophosphorus.

HERBERT J. KRASE.