Patented May 28, 1940 2,202,532

UNITED STATES PATENT OFFICE

2,202,532

SELENIUM PLATING OF STEEL

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No Drawing. Application July 12, 1939, Serial No. 284,092

4 Claims. (Cl. 204—1)

This invention relates to improvements in steels and is directed more particularly to the provision of austenitic steel or the like having surfaces adapted to withstand galling and seizing.

According to the novel features of this invention, a novel surface for austenitic steels and the like and method of producing the same is provided so that said steel is capable of withstanding galling and seizing without the objections inherent in austenitic steels where selenium is used as a constituent thereof.

According to prior art practice ferro-selenium in amounts of approximately .2% to .3% has been added as a constituent of austenitic steels in an attempt to provide material which would obviate seizing and galling but the results have not been satisfactory for several reasons.

The addition of selenium has produced steels which are not only dirty but it has appreciably lowered the impact value or at least lowered said value to an objectionable extent. Furthermore, the selenium which is poisonous creates a dangerous hazard in the steel manufacturing operations.

The above objections and disadvantages are overcome by means of this invention and is accomplished with steels such as austenitic steels by providing the steel with a selenium surface or plating as by a plating process. It has been discovered that the steel of this invention provided with a selenium plating is adapted to resist galling and seizing to a marked desired extent without the objections and disadvantages of the prior art procedure.

In carrying out the process of this invention ferro-selenium is dissolved in concentrated sulphuric acid and a plating bath is provided therefrom. The bath is made alkaline by the addition of ammonia and is subsequently made slightly acid by the addition of nitric acid.

The austenitic steel in various forms and shapes to be treated is immersed in the bath and electrically connected to the negative pole of a source of electrical energy while nichrome is suspended from the positive pole. The bath may be heated for the plating operation to a suitable plating temperature if desired or necessary.

According to the invention a very desirable selenium plating was provided by this method using 6 volts D. C. with a current flow of about 2½ amp. The time of the plating operation will depend upon the size, area, and physical character of the work being plated as well as on the thickness of plate desired. The procedure is variable within wide limits, of course, depending on the results desired.

Numerous steel specimens treated as above were subjected to abrasive and seizing tests. For instance specimens had their plated surfaces rubbed one against the other for a considerable time under about 100 lbs. pressure per square inch, at about 100 strokes per minute. These were found to be in excellent condition in all respects, the plated surfaces having the desired brightness and smoothness without evidence of galling or seizing or the effects of any abrasive action.

The unplated reverse surfaces of the specimens were subjected to the same conditions of test but almost immediately showed the results of serious seizing and galling.

Thus by plating steel such as austenitic steel according to the invention, it is possible to obtain the desired effects and advantages of selenium without the disadvantages, objections and hazards of the prior art procedure. It is possible, of course, to treat only certain parts or surfaces of the work if desired to provide the surface which is resistant to seizing and galling.

Having thus described my invention, and the best manner of practicing the new process of forming this novel composition, but without limiting myself to the order of steps, of such process recited, or the proportions of parts employed therein, or to the precise ingredients named, as it is evident that each of these ingredients has a considerable range of equivalents and that the order and proportions of the process may be varied without departing from its scope and purposes.

I claim:

1. A selenium plating bath made by dissolving ferro-selenium in sulphuric acid, making the resultant solution alkaline by adding ammonia, and then slightly acidifying the same by adding nitric acid.

2. The method of providing steel with a selenium surface which consists in, immersing said steel in a slightly acid bath made by dissolving ferro-selenium in sulphuric acid and adding thereto nitric acid and ammonia, and passing current between an anode and cathode immersed in said bath.

3. The method of providing steel with a selenium surface which consists in, immersing said steel in a bath made by dissolving ferro-selenium in sulphuric acid and making the resultant solution alkaline by adding ammonia and then slightly acidifying the same by adding nitric acid, and passing current between an anode immersed in said bath and the steel surface being coated.

4. A slightly acid selenium plating bath made by dissolving ferro-selenium in concentrated sulphuric acid and adding thereto ammonia and nitric acid.

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