Patented Jan. 11, 1949 2,458,908

UNITED STATES PATENT OFFICE

2,458,908

METHOD OF STRIPPING ELECTRO-DEPOSITED MANGANESE

James H. Jacobs, Boulder City, Nev., assignor, by mesne assignments, to Crimora Research and Development Corporation, Crimora, Va., a corporation of Virginia

No Drawing. Application November 13, 1944, Serial No. 563,325

2 Claims. (Cl. 204—105)

1

This invention relates to an improved method of treating electrolytic manganese and more particularly to heat treatment of such manganese to improve its mechanical and physical properties.

An important aim is to provide a method of heat-treating cathode plates on which manganese has been deposited to facilitate removal of the plated metal from the cathodes.

Other aims and advantages of the invention will appear in the following description of the preferred mode of practicing the method.

According to this invention, the cathode with the manganese deposited thereon, may be dipped or otherwise covered with a dichromate solution, for example, a 1% sodium or potassium dichromate solution, and is then washed in water. The purpose of this is to provide a bright surface after a subsequent heating step which will be described.

The cathode, with the manganese deposited thereon, is conveniently passed through an oven in which the temperature is maintained well below the allotropic transition temperature of about 742° C. Preferably, the temperature is maintained at about 350° C. for a substantial period, at least until gas evolution ceases. It has been found that this temperature toughens the metal.

The oven is preferably maintained under a partial vacuum of about 340 mm. of mercury. The plated cathode is allowed to remain in the oven from 15 minutes to 2 hours, depending upon the thickness of the deposited manganese on the cathode.

As an incidental result of the foregoing treatment, the occluded gases in the manganese deposit, particularly hydrogen, are driven off thereby providing a substantially hydrogen-free manganese, which is highly desirable for some commercial purposes, such as the production of high-grade alloys.

Ordinarily, the cathode is formed of metal, such as stainless steel, having a relatively low temperature coefficient of expansion with respect to manganese. As a result of its being subjected to the heat-treatment, above described, the layer of manganese on the cathode is toughened and is more or less loosened, so much so, that some of it may flake off in the oven. When the cathode is removed from the oven, the balance of the manganese is stripped off by either tapping or bending the cathode.

2

The method may be practiced by placing the cathodes on suitable racks and providing means for conveying them into and out of the evacuated oven without breaking the vacuum seal. Furthermore, suitable means may be provided for removing the flaked off portion of the manganese which collects in the bottom of the oven. The use of an evacuated oven is, however, not absolutely essential to the practice of the invention.

It has been found that, when the electrolytically deposited manganese is subjected to heat-treatment, as set forth, any gamma manganese present is transformed to alpha manganese. Moreover, it has been found that the manganese is not readily discolored by exposure to the air during heat-treatment. This is probably due to evolution of some of the occluded gases.

It will be understood that the present invention is not limited to the heat-treatment of manganese deposited on cathodes. It may also be practiced by first stripping the manganese from the cathodes and then subjecting the stripped manganese to the heat-treatment, as hereinbefore set forth. The principal purpose for such heat-treatment is to toughen the stripped metal and thereby minimize breakage in shipment, as well as to evolve the occluded gases, particularly hydrogen, which are objectionable when the manganese is subsequently used for alloying and other purposes.

Obviously, the foregoing method is not limited to a strict conformity with the steps thereof herein described, but is capable of many variations within the scope of the appended claims.

What is claimed is:

1. That method of stripping electrodeposited manganese in large pieces from a stainless steel cathode plate which is characterized by heating the plate with the deposited metal to a temperature of about 350° C. for a period of fifteen minutes to two hours; and then breaking the deposited metal from the cathode plate.

2. That method of stripping electrodeposited manganese from a stainless steel cathode plate which is characterized by heating the plate with the deposited metal to a temperature of about 350° C. for a period ranging between fifteen min-

utes and two hours in a partial vacuum; and then breaking the deposited metal from the cathode plate in the form of large flakes.

JAMES H. JACOBS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,803,691	Brockway	May 5, 1931
2,055,963	Boss	Sept. 29, 1936
2,061,759	Eitel et al.	Nov. 24, 1936
2,325,660	Chamberlain	Aug. 3, 1943

OTHER REFERENCES

Information Circular 6768 of the Bureau of Mines, May 1934, pp. 3 to 7.

Steel, vol. 105, Oct. 30, 1939, pp. 43–45.

Metal Industry, Mar. 22, 1940, pp. 273, 274.

Transactions of the Faraday Society, vol. 19 (1924), page 573.