Patented Nov. 7, 1950 2,529,345

UNITED STATES PATENT OFFICE

2,529,345

METHOD OF DURABLY FINISHING IRON ARTICLES AND COMPOSITION THEREFOR

Adolph W. Machlet, Elizabeth, N. J.

No Drawing. Application January 11, 1949, Serial No. 70,380

3 Claims. (Cl. 117—22)

1

This invention deals with a composition of matter and with a method whereby through its agency a durable rust-inhibiting finish may readily be imparted to metallic articles of manufacture, especially of iron and alloys thereof.

Manufacturers of such articles are concerned with the need of imparting to their products the property of maintaining a finish which will be attractive to purchasers thereof. It is especially desirable that the initially attractive appearance should not deteriorate during handling and upon exposure to the atmosphere. Articles made of iron, as is well known, are particularly subject to tarnish and rusting even when on exhibition indoors. Consequently, innumerable modes of giving them a protective coating have been proposed and put into practice. Thus they have been plated, as with zinc, cadmium, etc., either by wet or dry procedures, but to do so involves considerable expense; as well because of the requisite equipment as of the time and labor involved, and also the cost of the agents.

Through extended investigations, I have discovered and formulated ways and means for accomplishing the objective which involve the employment of material now existing in large quantities as waste and hence abundantly available at virtually no cost. Of further importance, my treatment admits of being carried out without the necessity of resorting to chemical baths (as in electro-plating) or molten baths which give off fumes deleterious to the health of the users. And of still further importance, my treatment can be carried out at temperatures below those which would unduly impair the physical characteristics of the articles.

To achieve these ends, an admixture is prepared in which the ingredients are all commingled in a finely divided state. This admixture is permanent in nature and may be kept indefinitely in stock, and can be furnished in bulk to users thereof. To compound it, about ten parts of so-called "red-mud" are thoroughly admixed with about four parts of finely divided charcoal and four parts of powdered copper ore concentrate. The latter is readily obtainable from Cuba and contains about 28–30% of copper and about 25% of iron; both in the form of sulphates. The "red-mud" is the residue resulting from the extraction of aluminum from bauxite or like alumina-bearing ores. This "red-mud" exists in large dumps and, being a waste product, it is available at virtually no cost. It consists of about 18% to 25% of alumina together with about 13% to 20% of ferric oxide, 7% to

2

12% of titanium oxide, 10% to 15% of silica, 10% to 18% of lime and 4% to 7% soda. In the form obtainable, it is somewhat dampish and, upon ignition during analysis, it loses about 14% to 17%; largely water.

The "red-mud," as well as the Cuban concentrate, having already been pulverized, it is not necessary to incur any expense in reducing it to that condition. The charcoal, being extremely soft, entails very little cost in powdering it.

These ingredients are thoroughly mixed to form my material which, as stated, can be retained indefinitely in bulk for distribution and usage.

To treat the articles, it is only necessary to inter-mingle them with my material and subject the whole, preferably while being tumbled, to a rising temperature. As the temperature slowly rises, there occurs a reaction between the carbon and the other agents present. Initially neutral or non-oxidizing atmosphere is created in the container and the oxides, while in immediate contact with the iron articles, undergo a reduction with a simultaneous coating of the articles. The presence of the copper materially promotes the penetration of the coating and hence its thickness and density. The temperature rise is held to around 1450°–1500° F., or somewhat less, so that the physical characteristics of the articles will not depart from those imparted to them by any heat-treatment to which they have been subjected by the manufacturer thereof. When the temperature has attained its predetermined limit, the mass is permitted to cool without access to air, and then the articles are removed and tumbled or scratch-brushed to free them from the dust thereon.

They will then possess an attractive and durable finish either grey-black or more or less tinged with a copperish color. This finish is hard and relatively deep and is resistant to atmospheric tarnish or rusting. It is in the nature of a surface alloy which extends to an appreciable depth depending on the duration of the heat treatment and the metal of which the articles are made which may be ferrous or non-ferrous as the case may be. Thus, by this treatment articles of aluminum acquire a tough skin which results from their intimate contact during the heating with the copper, carbon and sulphur components or elements of my admixture.

I claim:

1. A composition of matter for imparting a superior rust-inhibiting finish to metallic articles

which consists of a powdery mixture comprising red-mud, charcoal and copper sulphate in approximately the ratio of 2—4—1 respectively.

2. A powdery admixture for imparting a durable finish to iron articles composed of charcoal, red-mud containing about 20% alumina, 15% ferric oxid, 10% titanium oxid, 12% silica, 15% lime and 5% soda and also an ore concentrate containing about 25% iron sulphate and 30% copper sulphate.

3. A method of imparting a durable finish to iron articles which consists in mixing them with a powdery mixture containing about ten parts of red-mud, and about four parts of charcoal, and about four parts of an agent containing iron and copper sulphates, then subjecting the whole to a rising temperature until approximately 1500° F. is attained, and finally allowing the whole to cool in the absence of air.

ADOLPH W. MACHLET.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
379,438	Baldwin	Mar. 13, 1888
1,197,694	Watkins	Sept. 12, 1916