UNITED STATES PATENT OFFICE.

THURSTON C. MERRIMAN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO WINCHESTER REPEATING ARMS CO., OF NEW HAVEN, CONNECTICUT, A CORPORATION.

PROCESS OF SURFACE-COLORING ARTICLES OF COPPER ALLOY.

1,327,401. Specification of Letters Patent. Patented Jan. 6, 1920.

No Drawing. Application filed August 5, 1919. Serial No. 315,449.

To all whom it may concern:

Be it known that I, THURSTON C. MERRIMAN, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Processes of Surface-Coloring Articles of Copper Alloy; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improved process of coloring metallic articles, the object being to impart a durable and handsome finish of black, or substantially black, color, to alloys of copper containing arsenic.

With these ends in view, my invention consists in a process of coloring articles made of alloys containing copper and arsenic, which consists in first dipping the articles in an acid oxidizing bath and then in an acid solution containing a sulfid and an arsenious compound.

My invention further consists in a process having certain other details and steps as will be hereinafter described and pointed out in the claims.

In carrying out my invention, the articles whatever their form and destined use and specific composition, must contain copper and a small amount of arsenic. For instance, I may apply my invention to articles of brass, consisting say of 70 parts of copper, 29 parts of zinc and one part of arsenic, or my invention may be applied to articles of bronze consisting say of 85 parts of copper, 14 parts of tin and one part of arsenic. These illustrations of copper alloys will be sufficient to explain my present purpose. Other brasses and other bronzes might be used or other copper alloys, what I wish to make clear is that I do not limit myself to any specific copper alloy so long as it contains copper and a component of arsenic.

The article after having been thoroughly cleaned, is immersed for about five minutes at "room temperature" in an acid oxidizing bath. For this purpose, I may employ a bath made as follows:—

100 cc. water,
25 cc. nitric acid, (1.42 sp. gr.,)
5 gms. potassium dichromate.

I do not limit myself to the employment of a bath so made, but hold myself at liberty to employ a bath of similar character and action so long as it is an acid oxidizing bath. The article is then removed from this bath, rinsed in cold water, and then immersed in an acid solution containing sulfid and an arsenious salt, such as a solution compounded as follows:—

710 cc. water,
237 cc. hydrochloric acid, (1.2 sp. gr.,)
7.1 grams potassium sulfid,
170 grams arsenious oxid.

The article is allowed to remain in the second bath for about five minutes, the solution being kept at a temperature between 140—155 degrees F. The article is then removed from the solution, rinsed thoroughly in cold water and dried, and preferably coated very thinly with a light oil. On its removal from the second solution, the article will be found to be provided with a durable and handsome coating or finish of black, or substantially black, color.

The proportions of the several ingredients used in the respective solutions may be varied as demanded by their character and strength and by the composition of the alloy, and these factors may also change the given temperatures and periods of immersion.

I do not limit myself, therefore, to any of these details, as to copper, alloys and bath, my invention being broadly characterized by the production upon a metallic alloy containing copper and arsenic, of a durable finish of black, or substantially black, color, by first subjecting the article to the action of an acid oxidizing bath and subsequently to an acid solution containing a sulfid and an arsenious salt. In my co-pending application filed August 5, 1919, Serial No. 315,448, I have claimed the article resulting from the herein described and claimed process.

I claim:

1. The process of coloring articles made of alloys containing copper and arsenic which consists in dipping the articles in an acid, oxidizing bath and afterward in an acid solution containing a sulfid and an arsenious compound.

2. The process of coloring articles made of alloys containing copper and arsenic which consists in dipping the articles in a bath containing nitric acid and afterward in an acid bath containing an arsenious compound.

3. The process of coloring articles made

of alloys containing copper and arsenic, which consists in dipping the articles in a bath containing mineral acid and a soluble chromate and afterward in a bath containing mineral acid, an alkali sulfid, and an arsenious compound.

4. The process of coloring articles made of alloys containing copper and arsenic which consists in dipping the articles in a bath containing a mineral acid and zinc oxid in suspension and afterward in a bath containing mineral acid, alkali sulfid, and an arsenious compound.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THURSTON C. MERRIMAN.

Witnesses:

ARTHUR W. EARLE,
ERIK S. PALMER.