

UNITED STATES PATENT OFFICE.

HERBERT F. JERMAIN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO WINCHESTER REPEATING ARMS CO., OF NEW HAVEN, CONNECTICUT, A CORPORATION.

PROCESS OF COLORING IRON OR STEEL ARTICLES.

1,342,910.

Specification of Letters Patent.

Patented June 8, 1920.

No Drawing.

Application filed January 7, 1920. Serial No. 349,980.

To all whom it may concern:

Be it known that I, HERBERT F. JERMAIN, 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 Coloring Iron or Steel Articles; 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 and rust-proofing iron or steel articles, such as gun parts, some classes of hardware and the like, the object being to provide at a low cost, a rapid and efficient process for furnishing articles of the character indicated with a handsome and durable rust-proof surface.

With these ends in view, my invention consists in a process for electrolytically converting the surface of the article into a dense, compact and strongly adherent film of oxid by using the article alternately as the anode and cathode in an oxidizing, alkaline, electrolytic bath of which the other electrode is incorrodible.

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

In practising my invention, I employ an oxidizing alkaline bath of a solution of sodium nitrate in strong caustic soda. The solution is preferably made by the employment of approximately sixteen parts of sodium nitrate to forty parts of caustic soda and one hundred parts of water. Such a bath has approximately a specific gravity of 1.38 and a boiling point of approximately 124° C.

The article to be colored is placed in the bath and used as an anode against a carbon cathode for five minutes with a current density of approximately 4.5 amperes per square decimeter. The current is now reversed for the same period, the article then becoming the cathode and the carbon the anode of the bath. This cycle is preferably repeated three times. The article is then removed from the bath, washed in hot water,

dried, and rubbed with a suitable oil. For a dark blue or blue-black color, the bath is held just below its boiling point, and should not fall below 120° C., nor should the current density vary substantially from 4.5 amperes per square decimeter, but I do not limit myself to this range of temperature nor to this current density; at other ranges of temperature and at other current densities other colors will be produced. For example, a small excess or defect in the current density will produce a brassy sheen on the dark blue color, a slightly lower current density will produce a handsome Nile green color, while if the current density be considerably above or below the mentioned value, the color produced will be some shade of brown or even bright red.

I claim:

1. A process of coloring iron or steel articles, consisting in using them alternately as the anode and cathode of an electrolytic bath consisting of a solution of an oxidizing agent in an alkaline liquid, and having an incorrodible opposing electrode.

2. A process of coloring iron or steel articles, consisting in using them alternately as the anode and cathode of a strongly oxidizing alkaline electrolytic bath consisting of a solution of sodium-nitrate in strong caustic soda, in which bath the opposite electrode is of carbon.

3. A process of coloring iron or steel articles, consisting in using them alternately as the anode and cathode of an electrolytic bath consisting of a solution of an oxidizing agent in an alkaline liquid, and having an incorrodible opposing electrode; then removing the articles from the bath, washing them with hot water, drying them and rubbing them with oil.

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

HERBERT F. JERMAIN.

Witnesses:

DANIEL H. VEADER,
ERIK S. PALMER.