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BLACK FINISHING METAL ARTICLES

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This invention relates to the treatment of metal surfaces, and more particularly to black finishing metal articles.

The methods heretofore used for obtaining black finishes on metal articles vary with the type of metal being treated. In most cases the black finish is obtained by the formation of a dense layer of black oxide. One method of blackening steel comprises treating it in a molten bath containing alkali metal nitrates and hydroxides.

Black finishes heretofore obtained on iron or steel articles have not been as resistant to corrosion as other finishes, for instance those obtained by plating with corrosion-resisting metals.

An object of this invention is to produce on iron or steel articles a black finish which has a resistance to corrosion substantially equal to that of a chromium plated surface. Another object is to blacken the surface of a chromium plated article without substantial change in the corrosion resistance of the chromium plate. Other objects will appear hereinafter.

These objects are accomplished by treating a chromium surface with a cyanogen compound at an elevated temperature.

In one method of carrying out my invention, a chromium plated metal article is immersed in a bath of molten salts containing metal cyanide. If alkali metal cyanides are used, the bath must contain at least 30% by weight of the cyanide and the temperature must be maintained above 700° C., preferably at 700-900° C., in order to obtain good results. With more reactive cyanides, such as those of the alkaline earth metals, I may use lower proportions and/or lower temperatures.

My process may be applied to any chromium or chromium plated article which will not be adversely affected by the elevated temperature at which the process is operated.

Examples

1. Six bars of mild-carbon cold-rolled steel each 3½" long by ⅝" diameter were case hardened and then plated with chromium to produce a plate approximately 0.004 inch deep. Three of these bars were then immersed for 20 minutes at 860° C. in a bath containing about 45% sodium cyanide, 35% sodium carbonate and 20% sodium chloride and then quenched in cold water. The bars so treated became jet black. These bars, subjected to corrosion tests, proved to be fully as corrosion resistant as the chromium plated bars not black finished. One of the black

finished bars has been subjected to atmospheric corrosion for over two years without showing any signs of rusting.

2. A copper bar 8" long by 3" wide by ¼" thick was plated with approximately a 0.002 inch layer of chromium. This bar was then suspended for 30 minutes at 825° C. in a bath composed of approximately 30% sodium cyanide and 70% sodium carbonate and sodium chloride. This copper bar when removed from the bath and air cooled was found to have acquired a black finish.

Although in the first of the above two examples, the ferrous articles were case hardened before being chromium plated, it is not essential to so treat ferrous metals before practicing my invention. My process is applicable to chromium plated metals such as copper, nickel, iron alloys, or the like; such metals or alloys having a melting point above the temperature at which the cyanide bath is operated. My process is furthermore not adversely affected by an intermediate plated metals such as nickel or copper lying between the chromium plate and the main metal body of the article treated.

The black finish obtained by my process has substantially the same resistance to corrosion as that of the original chromium surface. It is hard and durable and has an attractive appearance.

I claim:

1. A process for black finishing a chromium plated metal article comprising treating said chromium plated article in a molten salt bath containing a cyanide from the group consisting of alkali metal cyanides and alkaline earth metal cyanides.

2. A process for black finishing chromium plated articles comprising treating said articles in a molten bath containing at least 30% of alkali metal cyanide.

3. A process for black finishing chromium plated articles comprising treating said articles in a molten bath containing at least 30% of sodium cyanide.

4. A process for black finishing a chromium plated metal article comprising treating said chromium plated article in a molten salt bath containing at least 30% by weight of a cyanide from the group consisting of alkali and alkaline earth metal cyanides.

5. A process for black finishing chromium plated steel articles comprising treating said articles in a molten bath containing 30-45% of

sodium cyanide, said bath being maintained at 700-900° C.

6. A process for black finishing a steel article comprising chromium plating said article and thereafter treating said article in a molten bath containing 30-45% of sodium cyanide, said bath being maintained at 700-900° C.

7. A process for black finishing chromium plated copper articles comprising treating said articles in a molten bath containing 30-45% of sodium cyanide, said bath being maintained at 700-900° C.

8. A process for black finishing chromium

plated steel articles comprising treating said articles in a molten salt bath containing 30-45% of a cyanide selected from the group consisting of alkali and alkaline earth cyanides, said bath being maintained at 700-900° C.

9. A process for black finishing chromium plated copper articles comprising treating said articles in a molten salt bath containing 30-45% of a cyanide selected from the group consisting of alkali and alkaline earth cyanides, said bath being maintained at 700-900° C.

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