UNITED STATES PATENT OFFICE.

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PRODUCING CHROMIUM SALTS.

1,157,668. Specification of Letters Patent. Patented Oct. 26, 1915.

No Drawing. Application filed January 12, 1914. Serial No. 811,648.

To all whom it may concern:

Be it known that I, JOHANN HEINRICH BONER, citizen of the German Empire, residing at Ludwigshafen-on-the-Rhine, Germany, have invented new and useful Improvements in Producing Chromium Salts, of which the following is a specification.

The technically important chromium salts have hitherto been obtained from chromium ores, in particular from chrome ironstone (Cr_2O_3FeO), by first roasting the ore with alkali in the presence of air, whereby the chromate is obtained, then separating this chromate from the iron oxid and then reducing it again to chromium salt.

I have now discovered that I can obtain chromium salts from chromium ores directly, without its being necessary to pass through the stage of chromates. In order to effect this, I treat the chromium ore, in particular chrome ironstone, at a high temperature and in the presence of a reducing agent, such for instance as coal, coke, or carbon monoxid, with chlorin or with hydrogen chlorid, which latter, for the purposes of this invention, I regard as equivalent to chlorin, and volatilize the iron chlorid away from the chlorid compound of chromium. By the action of the chlorin, or hydrogen chlorid, in the presence of a reducing agent on the chromium ore containing iron, the iron is transformed into an iron chlorid and the chromium is brought into the condition of a chlorid which is considerably less volatile than the iron chlorids, consequently the iron chlorid can be separated from the chlorid compound of chromium without difficulty. When employing chlorin according to this invention, both the iron chlorid and the chromium chlorid generally volatilize, but the chromium chlorid soon settles again upon somewhat cooler parts of the apparatus before the condensing point of the iron chlorid has been reached. If hydrogen chlorid be employed, the iron salt volatilizes easily, while the chromium salt may remain in the reaction apparatus. Soluble chromium compounds may be dissolved away by means of water.

The following examples will serve to illustrate the nature of my invention, which, however, is not confined to these examples. The parts are by weight:

Example 1: Mix intimately 10 parts of finely powdered chrome ironstone and 20 parts of finely powdered coke, and then heat the mixture to a bright red heat in a current of hydrogen chlorid. The iron volatilizes away in the form of ferrous chlorid and the residue is treated with water in the presence of air, filtered from excess of coke and any unaltered ore, where upon a solution of basic chromium chlorid practically free from iron is obtained.

Example 2: Pass a gas mixture containing about equal volumes of carbon monoxid and chlorin over powdered chrome ironstone at a high temperature. When ferric chlorid ceases to be given off, treat the residue with water in order to remove soluble impurities and then extract the anhydrous insoluble chromium chlorid in any suitable manner. In this way a solution of chromium chlorid of sufficient purity for technical purposes can be obtained.

Now what I claim is:—

1. The process of producing chromium salts from chromium ores by chlorinating the said ores in the presence of a reducing agent and volatilizing the iron chlorid away from the chlorid compound of chromium.

2. The process of producing chromium salts from chromium ores by heating the said chromium ores with a reducing agent in the presence of chlorin and volatilizing the iron chlorid away from the chlorid compound of chromium.

3. The process of producing chromium salts from chrome ironstone by heating the chrome ironstone with a reducing agent in the presence of chlorin, and volatilizing the iron chlorid away from the chlorid compound of chromium.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHANN HEINRICH BONER. [L. S.]

Witnesses:
S. S. BERGER,
ERNEST F. EHRHARDT.