

UNITED STATES PATENT OFFICE.

MARTIN FRANCIS COOMES AND ARUNAH WATERMAN HYDE, OF LOUISVILLE, KENTUCKY.

PROCESS OF MANUFACTURING AND TEMPERING STEEL.

SPECIFICATION forming part of Letters Patent No. 440,139, dated November 11, 1890.

Application filed February 7, 1890. Serial No. 339,589. (No specimens.)

To all whom it may concern:

Be it known that we, MARTIN FRANCIS COOMES and ARUNAH WATERMAN HYDE, citizens of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in the Process of Manufacturing Steel; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of our invention is to obtain a new and cheap tempering-bath and method of carburizing malleable cast-iron and steel which is low in carbon, and thereby convert them into a steel which is high in carbon. We attain this object by making a triple-saturated solution in water of chloride of sodium, chloride of ammonium, and sugar. Sirup, molasses, honey, or any similar saccharine substance is the equivalent of the sugar. Into this bath we place the metal to be carburized, raised to a white heat, and allow it to remain while cooling. The heat of the metal decomposes the bath, setting the carbon free, which is absorbed by and chemically unites with the metal.

The method of making the bath which we prefer is as follows: First, we make a saturated solution of chloride of sodium and water;

second, to said solution we add as much sugar as it will dissolve; and, third, to said double-saturated solution we add chloride of ammonium until it will hold no more. This triple-saturated solution is very dense, and possesses valuable properties as a tempering-bath. It is used for tempering in the ordinary manner, the metal, raised to a cherry-red or a dull cherry-red heat, being placed in the bath and allowed to remain until the desired temper is obtained.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In the manufacture of steel, the process of carburizing malleable cast-iron and low-carbon steel, which consists in placing the metal raised to a white heat in a bath composed of water, a sugar, chloride of sodium, and chloride of ammonium, substantially as described.

2. As a tempering and carburizing bath, the saturated solution of water, sugar, chloride of sodium, and chloride of ammonium.

In testimony whereof we affix our signatures in presence of two witnesses.

MARTIN FRANCIS COOMES.

ARUNAH WATERMAN HYDE.

Witnesses:

WM. B. ROGERS,

J. C. GETTEYS.