

UNITED STATES PATENT OFFICE.

LUDWIG SCHIECKE, OF MAGDEBURG, GERMANY, ASSIGNOR TO OTTO GENTSCH, OF SAME PLACE.

PROCESS OF HARDENING IRON OR STEEL.

SPECIFICATION forming part of Letters Patent No. 662,502, dated November 27, 1900.

Application filed June 28, 1900. Serial No. 22,005. (No specimens.)

To all whom it may concern:

Be it known that I, LUDWIG SCHIECKE, a subject of the King of Prussia, Emperor of Germany, residing at Magdeburg, Kingdom of Prussia, German Empire, have invented a certain new and useful Process of Hardening Steel or Iron, of which the following is a specification.

My invention relates to a new process of hardening all sorts of steel and iron; and it consists in the employment of certain compositions which during the separate periods of the process affect the piece of steel or iron to be hardened. I attain this purpose by coating the piece to be hardened with a composition consisting of pounded charcoal, corn-flour, slaked lime, and neat's-foot oil. This composition forms a paste which I lay upon and around the piece to be hardened, and I heat the whole until the metal is red-hot. I then immerse the heated piece in water, which has a small addition of sal-ammoniac, and move it until it is cooled. The surface of the water is covered with oil for the purpose of excluding the air. The bottom of the vessel which contains the water and sal-ammoniac is covered with a mud of lime, clay, or chalk, into which I immerse the cooled piece without having taken it out of the water and let it remain there for at least an hour before taking it out. Thus the piece does not come into contact with the air until perfectly cooled when taken out of the mud.

The effect of this process is as follows: The coating of the piece prevents the loss of carbon contained in the steel or iron by excluding the air during the heating process,

and also on the way from the fire to the water it prevents, therefore, a change in the quality. The chilling of the red-hot piece is tempered by the addition of sal-ammoniac to the water. As the piece after being cooled in the water is immediately sunk into the mud at the bottom of the vessel, it does not come into contact with the air, which cannot affect it. Thus a one-sided cooling is made impossible, and consequently the piece does not become crooked, as has been proved by many trials.

The result of the process is a tenacious hardness of the material, going considerably deeper than obtainable by the practice in use. A failure can only take place if the described process is not strictly carried out.

What I claim as my invention, and desire to secure by Letters Patent, is—

The hereinbefore - described process for hardening steel and iron, consisting in the heating of the piece to be hardened within a coating composed of pounded charcoal, corn-flour, slaked lime and neat's-foot oil; then cooling the red-hot piece in water with an addition of sal-ammoniac and a layer of oil to exclude the air; then sinking the piece into a mud of argillaceous substances contained at the bottom of the vessel until the cooling is complete.

In witness whereof I have hereunto set my hand in presence of two witnesses.

LUDWIG SCHIECKE.

Witnesses:

GEORGE H. MURPHY,
CARL OSTERMANN.