

# UNITED STATES PATENT OFFICE.

CARL GUSTAV MEISSNER AND ROBERT BENNEWITZ, OF MAGDEBURG,  
GERMANY.

## PROCESS OF HARDENING STEEL.

SPECIFICATION forming part of Letters Patent No. 646,528, dated April 3, 1900.

Application filed July 22, 1899. Serial No. 724,807. (No specimens.)

*To all whom it may concern:*

Be it known that we, CARL GUSTAV MEISSNER, iron-works proprietor, and ROBERT BENNEWITZ, engineer, subjects of the German Emperor, residing at 40 Augustastrasse, Magdeburg, in the German Empire, have invented certain new and useful Improvements in Processes of Hardening Steel; and we do hereby 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.

This invention relates to a process of hardening steel, which, on the one hand, imparts a cutting hardness to the steel, so that a re-tempering of the steel after hardening, as is the case with ordinary processes, is not necessary, and, on the other hand, prevents the bursting or fracture of the steel. After the steel is sufficiently heated it is immersed in one bath only for cooling, the said bath being composed of the following constituents, viz: about three parts of water and one part of a mixture comprising about one part, by weight, of zinc-white; one part, by weight, of charcoal-dust; one part, by weight, of leather liquor; one part, by weight, of petroleum. The three parts of water are intimately mixed with the one part of the above mixture. In this manner the steel has imparted to it an exceptional hardness, bursting or fracturing of the steel is practically prevented, and the

cutting efficiency of the steel is in no wise prejudiced.

There is no necessity to coat the steel with any substance, such as whitening or varnish, before heating it.

The leather liquor hereinabove referred to is obtained by boiling in ten liters of water one kilo of tanned-leather waste from leather which has not been in previous use or undergone any changes after tanning until the leather has softened and is leached out, the leather being allowed to remain in the liquor about twenty-four hours, after which the liquor is filtered off, as in a filter-press or otherwise. The liquor is then ready for use. This liquor may be prepared in any quantities and stored in barrels for use.

What we claim as our invention, and desire to secure by Letters Patent, is—

The process of hardening steel, which consists in cooling the heated metal in a bath composed of about three parts of water and one part of a mixture consisting of zinc-white, charcoal-dust, leather liquor and petroleum, substantially as set forth.

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

CARL GUSTAV MEISSNER.  
ROBERT BENNEWITZ.

Witnesses:

WOLDEMAR HAUPT,  
HENRY HASPER.