

Title (en)  
PROCESS FOR PRODUCING HIGH-CONCENTRATION CARBURIZED STEEL

Title (de)  
VERFAHREN ZUR HERSTELLUNG VON HOCHKONZENTRIERTEM AUFGEKOHLTEM STAHL

Title (fr)  
PROCÉDÉ DE FABRICATION D'ACIER CÉMENTÉ À HAUTE CONCENTRATION

Publication  
**EP 2085493 A4 20091125 (EN)**

Application  
**EP 07830687 A 20071026**

Priority  
• JP 2007070953 W 20071026  
• JP 2006299836 A 20061106

Abstract (en)  
[origin: EP2085493A1] The subject of the present invention is to provide a manufacturing method for high-concentration carburized steel which does not cause reduction of life of a furnace, deformation of steel materials, and reduction of working efficiency and which enables dispersion of fine and spherical carbides in a large amount. This subject can be solved by the manufacturing method for high-concentration carburized steel comprises (i) a primary carburization step of carburizing a steel material having a certain composition at a primary carburization temperature T1(°C) till a surface carbon concentration C becomes a certain carbon concentration, (ii) a cooling step of cooling the steel material to Ar1 point or less at a cooling rate of 1°C/min or more after completion of the primary carburization step, (iii) a secondary carburization initial step of raising the temperature of the steel material to a secondary carburization start temperature T2s lower than the primary carburization temperature T1 by 100°C or more to carburize the steel material at a secondary carburization temperature T2, (iv) a secondary carburization later step of raising the temperature, after completion of the secondary carburization initial step, to a quenching temperature Tq to further carburize at the quenching temperature of Tq and perform further carburization of the steel material at the quenching temperature Tq, and (v) a quenching step of quenching the steel material after completion of the secondary carburization.

IPC 8 full level  
**C23C 8/22** (2006.01); **C21D 1/06** (2006.01); **C21D 6/00** (2006.01); **C22C 38/00** (2006.01); **C22C 38/18** (2006.01)

CPC (source: EP US)  
**C21D 1/06** (2013.01 - EP US); **C21D 6/002** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/18** (2013.01 - EP US); **C23C 8/22** (2013.01 - EP US)

Citation (search report)  
• [A] JP S5569252 A 19800524 - KOMATSU MFG CO LTD  
• [A] US 2006130935 A1 20060622 - HATTORI ATSUSHI [JP], et al  
• [A] JP H083629 A 19960109 - SUMITOMO METAL IND  
• See references of WO 2008056552A1

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

DOCDB simple family (publication)  
**EP 2085493 A1 20090805**; **EP 2085493 A4 20091125**; CN 101535522 A 20090916; CN 101535522 B 20110518; JP 2008115427 A 20080522; JP 4971751 B2 20120711; US 2010126632 A1 20100527; WO 2008056552 A1 20080515

DOCDB simple family (application)  
**EP 07830687 A 20071026**; CN 200780041343 A 20071026; JP 2006299836 A 20061106; JP 2007070953 W 20071026; US 44791407 A 20071026