

Title (en)

CARBONITRIDING METHOD HAVING A FINAL NITRIDATION STEP DURING TEMPERATURE DECREASE

Title (de)

KARBONITRIERUNGSVERFAHREN MIT EINEM ABSCHLIESSENDEN NITRIERUNGSSCHRITT WÄHREND EINES TEMPERATURABFALLS

Title (fr)

PROCEDE DE CARBONITRURATION A ETAPE DE NITRURATION FINALE PENDANT UNE DESCENTE DE TEMPERATURE

Publication

EP 2773789 A1 20140910 (FR)

Application

EP 12772768 A 20121008

Priority

- FR 1159878 A 20111031
- EP 2012069890 W 20121008

Abstract (en)

[origin: WO2013064337A1] The invention relates to a method for the carbonitriding of steel parts, in particular parts used in the manufacture of automobiles, comprising: a heating step that includes a simple heating phase (M) followed by an initial nitridation phase (Ni) from a temperature between 700° C and 750° C to a temperature between 860° C and 1000° C and is carried out using a reduced temperature gradient compared to the simple heating phase; and alternate cementing (C1-Cn) and nitridation (N1- Nn) steps at constant temperature; wherein the final nitridation step is accompanied with a decrease in temperature immediately before quenching (T).

IPC 8 full level

C23C 8/02 (2006.01); **C23C 8/22** (2006.01); **C23C 8/26** (2006.01); **C23C 8/32** (2006.01); **C23C 8/34** (2006.01); **C23C 8/80** (2006.01)

CPC (source: EP US)

C23C 8/02 (2013.01 - EP US); **C23C 8/22** (2013.01 - EP US); **C23C 8/26** (2013.01 - EP US); **C23C 8/32** (2013.01 - EP US); **C23C 8/34** (2013.01 - EP US); **C23C 8/80** (2013.01 - EP US)

Citation (search report)

See references of WO 2013064337A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

FR 2981949 A1 20130503; **FR 2981949 B1 20131108**; BR 112014010316 A2 20170502; CN 103958720 A 20140730; CN 103958720 B 20160518; EP 2773789 A1 20140910; EP 2773789 B1 20190220; IN 3955CHN2014 A 20151023; JP 2014532810 A 20141208; JP 6138810 B2 20170531; KR 101945005 B1 20190201; KR 20140101750 A 20140820; MX 2014005221 A 20150309; MX 357137 B 20180627; US 2014290800 A1 20141002; US 9938615 B2 20180410; WO 2013064337 A1 20130510

DOCDB simple family (application)

FR 1159878 A 20111031; BR 112014010316 A 20121008; CN 201280053988 A 20121008; EP 12772768 A 20121008; EP 2012069890 W 20121008; IN 3955CHN2014 A 20140526; JP 2014539275 A 20121008; KR 20147015027 A 20121008; MX 2014005221 A 20121008; US 201214354393 A 20121008