

Title (en)

METHOD OF ANNEALING STEEL STRIP IN AN ANNEALING FURNACE WITHOUT THE FORMATION OF SOOT

Title (de)

VERFAHREN ZUM RUSSFREIEN GLÜHEN VON STAHLBAND IN EINEM GLÜHOFEN

Title (fr)

PROCEDE DE RECUIT SANS FORMATION DE SUIE DE FEUILLARDS D'ACIER DANS UN FOUR A RECUIT

Publication

**EP 0673443 B2 20010110 (DE)**

Application

**EP 94901900 A 19931127**

Priority

- DE 4241746 A 19921211
- EP 9303334 W 19931127

Abstract (en)

[origin: US5645655A] A process to anneal a steel strip in an annealing furnace in an inert-gas atmosphere containing hydrogen, with reduced formation of carbon black and encompassing the phases of heating, retention and cooling, wherein on the surface of the steel strip are impurities containing carbon components, and wherein during the annealing, there is a reaction between the H<sub>2</sub> and the carbon components of the impurities on the surface of the steel strip, whereby said reaction changes the composition of the inert gas atmosphere in the annealing furnace from an inert gas containing H<sub>2</sub> into a gas mixture containing H<sub>2</sub> and CH<sub>4</sub>, which forms an H<sub>2</sub>-CH<sub>4</sub> system, and wherein the annealing furnace is flushed during the phase of retention, the phase of cooling, or during both the phases of retention and cooling, as a function of at least one of the thermodynamic limit values of the H<sub>2</sub>-C<sub>4</sub> system.

IPC 1-7

**C21D 9/67**; **C21D 1/76**

IPC 8 full level

**C21D 1/76** (2006.01); **C21D 9/67** (2006.01); **C21D 9/52** (2006.01); **C21D 11/00** (2006.01)

CPC (source: EP US)

**C21D 1/76** (2013.01 - EP US); **C21D 9/67** (2013.01 - EP US); **C21D 9/52** (2013.01 - EP US); **C21D 11/00** (2013.01 - EP US)

Citation (opposition)

Opponent :

- DE 3931195 A1 19900329 - BANDSTAHLKOMBINAT MATERN VEB [DD]
- DE 3631551 C1 19871119 - MESSER GRIESHEIM GMBH
- "Die Schmierung beim Kaltwalzen und das Glühen von Kaltband unter Wasserstoff - insbesondere im Hinblick auf die Bandsauberkeit", Verein Deutscher Eisenhüttenleute, Fachausschussbericht 4032, Düsseldorf, Oktober 1990, S. 185-197
- W.A. Beugeling: "Improved Performance of Batch Annealing at Hoogovens Ijmuiden, by Applying 100% Hydrogen as Process Atmosphere", S. 1-9 vorgetragen am Internationalen Kongress HICON/H<sub>2</sub>, 20-22 Mai, 1992 in Linz (AT)
- Lehrbuch "Grundlagen der allgemeinen und anorganischen Chemie", H.R. Christen, 3. Aufl. 1971, S. 177, 206-211
- B.J. Hewitt: "The New Quality achieved with HICON/H<sub>2</sub> Bell Annealer", S.1-17, vorgetragen am Internationalem Kongress HICON/H<sub>2</sub>, 20.-22. Mai 1992 in Linz (AU), S. 1-18

Designated contracting state (EPC)

AT BE DE FR GB IT LU

DOCDB simple family (publication)

**WO 9413843 A1 19940623**; AT E149575 T1 19970315; DE 4241746 C1 19940825; DE 59305669 D1 19970410; EP 0673443 A1 19950927; EP 0673443 B1 19970305; EP 0673443 B2 20010110; HR P931483 A2 19950228; HR P931483 B1 19980630; SI 9300652 A 19940630; SI 9300652 B 20020228; US 5645655 A 19970708; ZA 939267 B 19950213

DOCDB simple family (application)

**EP 9303334 W 19931127**; AT 94901900 T 19931127; DE 4241746 A 19921211; DE 59305669 T 19931127; EP 94901900 A 19931127; HR P931483 A 19931210; SI 9300652 A 19931210; US 48877695 A 19950608; ZA 939267 A 19931210