

Title (en)

Process for heat-treating of metals.

Title (de)

Verfahren zum Wärmebehandeln von Metallen.

Title (fr)

Procédé de traitement thermique de metaux.

Publication

EP 0406047 B1 19950816 (FR)

Application

EP 90401645 A 19900614

Priority

FR 8908786 A 19890630

Abstract (en)

[origin: US5069728A] Heat treating metals by continuous longitudinal passage of metallic pieces in an elongated treating zone under controlled atmosphere having a high temperature upstream end where the controlled atmosphere comprises nitrogen and reducing chemical substances, such as hydrogen, possibly carbon monoxide, and a downstream cooling end under an atmosphere essentially formed by introducing nitrogen. In the high temperature upstream end, the nitrogen which constitutes the atmosphere is supplied by introducing nitrogen with a residual oxygen content not exceeding 5%, the reducing chemical substances being present at any moment in amounts at least sufficient to eliminate oxygen introduced with nitrogen. The nitrogen introduced in the downstream cooling end is substantially free of oxygen. Application of the process to the annealing of metallic pieces.

IPC 1-7

C21D 1/76; **C21D 3/04**; **C22F 1/02**

IPC 8 full level

C01B 21/04 (2006.01); **C21D 1/76** (2006.01); **C21D 3/04** (2006.01); **C22F 1/02** (2006.01)

CPC (source: EP US)

C21D 1/76 (2013.01 - EP US); **C21D 1/763** (2013.01 - EP US); **C21D 3/04** (2013.01 - EP US); **C22F 1/02** (2013.01 - EP US)

Citation (examination)

- DE 1110675 C
- DE 1063624 B 19590820 - ROBERT VON LINDE DIPL ING

Cited by

EP0541006A3; WO9321350A1

Designated contracting state (EPC)

BE DE ES FR IT SE

DOCDB simple family (publication)

US 5069728 A 19911203; CA 2020077 A1 19901231; DE 69021658 D1 19950921; DE 69021658 T2 19960201; EP 0406047 A1 19910102; EP 0406047 B1 19950816; ES 2075177 T3 19951001; FR 2649123 A1 19910104; FR 2649123 B1 19910913; JP H0347914 A 19910228

DOCDB simple family (application)

US 54358190 A 19900626; CA 2020077 A 19900628; DE 69021658 T 19900614; EP 90401645 A 19900614; ES 90401645 T 19900614; FR 8908786 A 19890630; JP 16586190 A 19900626