

Title (en)
Method for hardening of work pieces of steel

Title (de)
Verfahren zum Härten von Werkstücken aus Stahl

Title (fr)
Méthode pour le durcissement de pièces d'acier

Publication
EP 0313888 B2 19980617 (DE)

Application
EP 88116477 A 19881005

Priority
DE 3736501 A 19871028

Abstract (en)
[origin: US4867808A] A process for heat treatment of metallic workpieces by heating in a vacuum furnace followed by quenching in a coolant gas under above-atmospheric pressure and with coolant-gas circulation.

IPC 1-7
C21D 1/773; **C21D 1/767**; **C21D 1/613**

IPC 8 full level
C21D 1/18 (2006.01); **C21D 1/613** (2006.01); **C21D 1/74** (2006.01); **C21D 1/767** (2006.01); **C21D 1/773** (2006.01); **F27B 5/16** (2006.01)

CPC (source: EP US)
C21D 1/613 (2013.01 - EP US); **C21D 1/767** (2013.01 - EP US); **C21D 1/773** (2013.01 - EP US); **F27B 5/16** (2013.01 - EP US); **F27B 2005/161** (2013.01 - EP US)

Cited by
EP0869189A1; EP1088901A1; EP0495151A1; EP0562250A1; US5452882A; EP0960949A1; FR2779218A1; EP0451050A1; FR2660669A1; DE10044362A1; DE10044362C2; DE10030046C1; EP1167548A3; FR2660744A1; BE1006163A4; EP0962538A3; US6776854B2; US6216358B1; US6428742B1; US6554922B2

Designated contracting state (EPC)
AT BE CH DE ES FR GB IT LI LU NL SE

DOCDB simple family (publication)
US 4867808 A 19890919; **US 4867808 B1 19940222**; AT E65801 T1 19910815; AU 2440488 A 19890504; AU 606473 B2 19910207; BG 49828 A3 19920214; BR 8805492 A 19890704; CA 1308631 C 19921013; CN 1015066 B 19911211; CN 1033841 A 19890712; CS 274632 B2 19910915; CS 711188 A2 19901012; DD 283421 A5 19901010; DE 3736501 C1 19880609; DE 3864007 D1 19910905; DK 167497 B1 19931108; DK 596588 A 19890429; DK 596588 D0 19881027; EP 0313888 A1 19890503; EP 0313888 B1 19910731; EP 0313888 B2 19980617; ES 2023993 B3 19920216; ES 2023993 T5 19980801; FI 86560 B 19920529; FI 86560 C 19920910; FI 884513 A0 19880930; FI 884513 A 19890429; HR P920581 A2 19950228; HR P920581 B1 19971031; HU 204102 B 19911128; HU T49651 A 19891030; IL 87762 A0 19890228; IL 87762 A 19930131; JP 3068135 B2 20000724; JP H01149920 A 19890613; MX 169690 B 19930719; NO 169244 B 19920217; NO 169244 C 19920527; NO 884389 D0 19881004; NO 884389 L 19890502; PL 159767 B1 19930129; PL 275471 A1 19890502; PT 88896 A 19890914; RO 110067 B1 19950929; RU 1813104 C 19930430; SI 8811937 A8 19970630; UA 13002 A 19970228; YU 193788 A 19900430; YU 46574 B 19931116; ZA 886853 B 19890530

DOCDB simple family (application)
US 26192788 A 19881025; AT 88116477 T 19881005; AU 2440488 A 19881027; BG 8572288 A 19881017; BR 8805492 A 19881025; CA 581505 A 19881027; CN 88108740 A 19881026; CS 711188 A 19881027; DD 32110888 A 19881026; DE 3736501 A 19871028; DE 3864007 T 19881005; DK 596588 A 19881027; EP 88116477 A 19881005; ES 88116477 T 19881005; FI 884513 A 19880930; HR P920581 A 19920929; HU 561488 A 19881027; IL 8776288 A 19880915; JP 26734188 A 19881025; MX 1344588 A 19881017; NO 884389 A 19881004; PL 27547188 A 19881025; PT 8889688 A 19881028; RO 13563088 A 19881025; SI 8811937 A 19881017; SU 4356709 A 19881026; UA 4356709 A 19881026; YU 193788 A 19881017; ZA 886853 A 19880914