

Title (en)

Steel and process for forming a steel article by cold plastic working

Title (de)

Stahl und Verfahren zur Formung eines Stahlwerkstückes durch kalte plastische Verarbeitung

Title (fr)

Acier et procédé pour la fabrication d'une pièce en acier mise en forme par déformation plastique à froid

Publication

**EP 0851038 B2 20071107 (FR)**

Application

**EP 97402978 A 19971210**

Priority

FR 9616254 A 19961231

Abstract (en)

[origin: EP0851038A1] Steel contains by weight 0.03-0.16% carbon, 0.5-2% manganese, 0.05-0.5% silicon, 0-1.8% chromium, 0-0.25% molybdenum, 0.001-0.05% aluminium, 0.001-0.05% titanium, 0-0.15% vanadium, 0.0005-0.005% boron, 0.004-0.012% nitrogen and 0.001-0.09% sulphur, optionally also up to 0.005% calcium, 0.01% tellurium, 0.04% selenium and 0.3% lead and the rest iron and impurities. Proportions are governed by the following: Mn+0.9 Cr+1.3 Mo+1.6 V=at least 2.2%, and Al+Ti=at least 3.5 N. Also claimed are a hot-rolled semi-product of the steel with a bainitic structure and processes wherein pieces of the steel are hot-rolled, cut to size and then cold-formed, a bainitic structure being conferred by heating above 940 deg. C and quenching, either during and after hot-rolling or after cold-forming, also pieces of steel so formed.

IPC 8 full level

**C21D 7/02** (2006.01); **C22C 38/14** (2006.01); **C21D 8/00** (2006.01); **C21D 8/02** (2006.01); **C22C 38/00** (2006.01); **C22C 38/28** (2006.01); **C22C 38/32** (2006.01); **C22C 38/38** (2006.01); **C22C 38/60** (2006.01); **C21D 8/06** (2006.01)

IPC 8 main group level

**C21C 5/00** (2006.01)

CPC (source: EP US)

**C21D 8/00** (2013.01 - EP US); **C22C 38/001** (2013.01 - EP US); **C22C 38/32** (2013.01 - EP US); **C21D 8/06** (2013.01 - EP US); **C21D 2211/002** (2013.01 - EP US)

Citation (opposition)

Opponent :

GB 2195658 A 19880413 - BRITISH STEEL CORP

Cited by

EP2199422A1; FR2802607A1; EP1183399B2

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**EP 0851038 A1 19980701**; **EP 0851038 B1 20030326**; **EP 0851038 B2 20071107**; AR 011312 A1 20000816; AT E235579 T1 20030415; BR 9705637 A 19990803; CA 2225782 A1 19980630; CN 1195708 A 19981014; CZ 412897 A3 19990512; DE 69720163 D1 20030430; DE 69720163 T2 20040304; DE 69720163 T3 20080306; DK 0851038 T3 20030721; DK 0851038 T4 20080102; ES 2196279 T3 20031216; ES 2196279 T5 20080501; FR 2757877 A1 19980703; FR 2757877 B1 19990205; HU 9702515 D0 19980302; HU P9702515 A2 19980728; HU P9702515 A3 19990628; JP 2007284796 A 20071101; JP 3988095 B2 20071010; JP H10204585 A 19980804; KR 19980064836 A 19981007; NO 321331 B1 20060424; NO 976099 D0 19971229; NO 976099 L 19980701; PL 191871 B1 20060731; PL 324075 A1 19980706; PT 851038 E 20030731; RU 2201468 C2 20030327; SI 9700323 A 19980831; US 5919415 A 19990706

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