Title (en)

PRODUCTION METHOD OF GRAIN-ORIENTED SILICON STEEL WITH HIGH MAGNETIC FLUX DENSITY

Title (de)

HERSTELLUNGSVERFAHREN FÜR EINEN KORNORIENTIERTEN SILIZIUM-STAHL MIT HOHER MAGNETISCHER FLUSSDICHTE

Title (fr)

PROCÉDÉ DE PRODUCTION D'UN ACIER AU SILICIUM À GRAINS ORIENTÉS AYANT UNE DENSITÉ ÉLEVÉE DE FLUX MAGNÉTIQUE

Publication

EP 2623621 A1 20130807 (EN)

Application

EP 11827950 A 20110414

Priority

- CN 201010298954 A 20100930
- CN 2011072768 W 20110414

Abstract (en)

A method for manufacturing an oriented silicon steel product with high magnetic-flux density comprises the following procedures:1) smelting and casting, wherein the oriented silicon steel is composed of, by weight, 0.035#¼0.065% of C, 2.9#¼4.0% of Si, 0.05#¼0.20% of Mn, 0.005#¼0.01% of S, 0.015#¼0.035% of Al, 0.004#¼0.009% of N, 0.005#¼0.090% of Sn, 0.200#¼0.800% of Nb, the rest being Fe; and after being smelted, molten steel is secondarily refined and continuous casted into steel slabs; 2) hot rolling; 3) normalizing; 4) cold rolling; 5) decarburization annealing; 6) MgO coating; 7) high temperature annealing: said sheets are firstly heated to 700#¼900°C and then secondarily heated to 1200°C at temperature rise rate of 9#¼17°C/hr and maintained at 1200°C for 20hr; 8) coating an insulation layer. According to the present invention, steel sheets can be fully nitrided during high temperature annealing, which can ensure a secondary re-crystallization to take place perfectly, thereby, the oriented silicon steel sheets with high magnetic-flux density can be achieved. The present invention solves the problem of nitriding that is encountered in production of high-magnetic-induction oriented silicon steel by the technique to heat steel slabs to a lower temperature.

IPC 8 full level

C22C 33/00 (2006.01); **C21D 1/26** (2006.01); **C21D 1/68** (2006.01); **C21D 3/04** (2006.01); **C21D 8/12** (2006.01); **C22C 38/12** (2006.01)

CPC (source: EP KR US)

C21D 1/26 (2013.01 - KR); **C21D 8/0263** (2013.01 - US); **C21D 8/0284** (2013.01 - US); **C21D 8/12** (2013.01 - EP KR US); **C21D 8/1222** (2013.01 - EP US); **C21D 8/1233** (2013.01 - EP US); **C21D 8/1255** (2013.01 - EP US); **C21D 8/1261** (2013.01 - EP US); **C21D 8/1272** (2013.01 - EP US); **C21D 8/1283** (2013.01 - EP US); **C22C 33/00** (2013.01 - KR); **C22C 38/001** (2013.01 - EP US); **C22C 38/008** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/06** (2013.01 - EP US); **C22C 38/12** (2013.01 - EP KR US); **H01F 1/16** (2013.01 - EP US)

Cited by

CN110218853A; WO2023090986A1; EP4273280A1

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)

EP 2623621 A1 20130807; **EP 2623621 A4 20171206**; **EP 2623621 B1 20190313**; CN 102443736 A 20120509; CN 102443736 B 20130904; JP 2013545885 A 20131226; JP 5864587 B2 20160217; KR 101451824 B1 20141016; KR 20130049823 A 20130514; MX 2013003367 A 20130522; MX 350000 B 20170823; RU 2013114861 A 20141110; RU 2552562 C2 20150610; US 2013233450 A1 20130912; WO 2012041054 A1 20120405

DOCDB simple family (application)

EP 11827950 A 20110414; CN 201010298954 A 20100930; CN 2011072768 W 20110414; JP 2013530534 A 20110414; KR 20137008095 A 20110414; MX 2013003367 A 20110414; RU 2013114861 A 20110414; US 201113823424 A 20110414