

Title (en)

PROCESS FOR PRODUCING GRAIN-ORIENTED ELECTRICAL STEEL SHEET HAVING HIGH MAGNETIC FLUX DENSITY

Publication

EP 0390142 A3 19920930 (EN)

Application

EP 90106018 A 19900329

Priority

- JP 7999189 A 19890330
- JP 7999289 A 19890330

Abstract (en)

[origin: EP0390142A2] A process for producing a grain-oriented electrical steel sheet having a high magnetic flux density, comprising the steps of: heating a steel slab comprising 1.8 to 4.8 wt% Si, 0.012 to 0.050 wt% acid-soluble Al, 0.010 wt% or less N, and the balance consisting of Fe and unavoidable impurities, to a temperature for hot rolling; hot-rolling the heated slab to form a hot-rolled strip; cold-rolling the hot-rolled strip to a final product sheet thickness at a final cold rolling reduction of 80% or more by a single step of cold rolling or by two or more steps of cold rolling with an intermediate annealing step inserted therebetween; primary-recrystallization-annealing the cold-rolled strip; final-annealing the primary-recrystallization-annealed strip so that secondary-recrystallized grains substantially completely grow up in a temperature region of from 1000 to 1100 DEG C and then purification is effected above 1100 DEG C; and subjecting the primary-recrystallization-annealed steel strip to a nitriding treatment before a secondary recrystallization occurs during the final annealing.

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C21D 8/12

IPC 8 full level

C21D 8/12 (2006.01)

CPC (source: EP)

C21D 8/1255 (2013.01); **C21D 8/1272** (2013.01)

Citation (search report)

- [X] EP 0307905 A2 19890322 - NIPPON STEEL CORP [JP]
- [A] EP 0098324 A1 19840118 - NIPPON STEEL CORP [JP]
- [AD] EP 0219611 B1 19900516
- [A] US 2867559 A 19590106 - MAY JOHN E
- [A] PATENT ABSTRACTS OF JAPAN vol. 9, no. 82 (C-275)(1805) 11 April 1985 & JP-A-59 215 419 (SHIN NIPPON SEITETSU) 5 December 1984
- [A] PATENT ABSTRACTS OF JAPAN vol. 12, no. 84 (C-482)17 March 1988 & JP-A-62 222 024 (NIPPON STEEL) 30 September 1987

Cited by

EP0585956A1; EP0600181A1; US5266129A; US5261972A; DE4311151C1; EP0566986A1; US5512110A; DE10311215A1; DE10311215B4; EP0588342A1; US5858126A; EP2107130A1; EP1179603A3; EP0526834A1; US5354389A; US5489342A; US6858095B2

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