Title (en)

Process for manufacturing grain-oriented magnetic steel spring

Title (de)

Verfahren zur Herstellung von kornorientiertem Elektroband

Title (fr)

Procédé de fabrication de bande d'acier magnétique à grains orientés

Publication

EP 1752549 B1 20160120 (DE)

Application

EP 05016835 A 20050803

Priority

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Abstract (en)

[origin: EP1752549A1] A method for the production of grain-oriented electric steel strip by continuous thin-slab casting, involves a continuous hot-rolling stage on a line-mounted multiple-stand milling train at 900-1200[deg]C, with reductions of more than 40% in the first pass and not more than 30% in the last pass and with rolling in the two-phase mixture range in at least the second and third passes.. A method for the production of grain-oriented electric steel strip based on a continuous thin-slab casting process, involves (a) melting steel containing (apart from iron and unavoidable impurities) 2.5-4.0 wt% silicon, 0.02-0.10 wt% carbon, 0.01-0.065 wt% aluminum, 0.003-0.015 wt% nitrogen, and optionally up to 0.30 wt% manganese, up to 0.05 wt% titanium, up to 0.3 wt% phosphorus, not more than 0.04 wt% sulfur and/or selenium (total), up to 0.2 wt% (each) of one or more of the elements arsenic, tin, antimony, tellurium or bismuth, up to 0.5 wt% (each) of one or more of the elements copper, nickel, chromium, cobalt or molybdenum and up to 0.012 wt% (each) of one or more of the elements boron, vanadium or niobium, (b) secondary metallurgical processing of the melt in a vacuum unit and/or a pan furnace, (c) continuous casting to form a strip, (d) cutting the strip into thin slabs, (e) heating to 1050-1300[deg]C for not more than 60 minutes in an in-line furnace, (f) continuous hot-rolling in a line-mounted multiple stand mill train to give rolled strip with a thickness of 0.5-4.0 mm, using a temperature of 900-1200[deg]C for the first pass with a reduction of more than 40%, rolling in the two-phase mixture range (alpha - gamma) in at least the next two passes and with a reduction of not more than 30% in the last pass, (g) cooling the strip, (h) rolling the strip into a coil, (i) optionally annealing the strip after coiling or before cold-rolling, (j) cold-rolling to cold-rolled strip with a final thickness of 0.15-0.50 mm, (k) annealing with recrystallisation and decarbonisation, (l) treating the strip surface with a scale separator, (m) final annealing to develop a Goss structure, (n) optional coating with electrical insulation followed by stress-relieving annealing and (o) optional domain refinement.

IPC 8 full level

C21D 8/12 (2006.01); **C22C 38/02** (2006.01)

CPC (source: EP KR US)

C21D 8/12 (2013.01 - KR); **C21D 8/1222** (2013.01 - EP US); **C21D 8/1244** (2013.01 - EP US); **C21D 8/1261** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP KR US)

Citation (examination)

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