

Title (en)

Improvements of steel strip heating methods in vertical furnaces

Title (de)

Verbesserungen von Verfahren zur Erwärmung von Stahlbändern in senkrechten Öfen

Title (fr)

Perfectionnements apportés aux procédés de chauffage de bandes d'acier dans des fours verticaux

Publication

EP 1229138 A1 20020807 (FR)

Application

EP 02290100 A 20020115

Priority

FR 0101331 A 20010131

Abstract (en)

[origin: KR20020064159A] PURPOSE: A method of reducing the wrinkles formed in heating zones, by radiant tubes, of continuous heat treatment lines for metal strip, such as annealing or galvanizing lines is provided. CONSTITUTION: In a method of reducing the wrinkles formed in heating zones, by radiant tubes, of continuous heat treatment lines for metal strip(3), such as annealing or galvanizing lines, the method is characterized in that the strip passes over transporting and/or return rollers(2) in the furnaces(1), the method, which consists in modifying the thermal state of the rollers, wherein the modification is made directly by varying the heating by the radiant tubes(4) located near the rollers(2), thereby directly controlling the heat flux emitted by the radiant tubes towards the rollers, wherein each radiant tube is supplied separately and independently with combustion air and with fuel and the flow rate of fuel for each radiant tube is continuously adjusted, wherein the radiant tubes close to the rollers are stopped, in an anticipatory manner, so as to facilitate a strip width transition from the narrow type to the wide type, wherein, in the case of wide strip, the highest possible radiant tube temperature is maintained in those parts of the furnace which are located downstream, wherein, in the case of narrow strip, a low radiant tube temperature is maintained, wherein certain radiant tubes are operated in on/off mode, wherein the heating by the radiant tubes is varied so as to reduce, or even eliminate, the thermal gradient in the furnace between the bottom rollers and the top rollers of the latter, and wherein the method further includes programmed management of the strip-heating curves, which is tailored to the strip formats and to the heat cycles, in the steady state or during the transient phases.

Abstract (fr)

Procédé de réduction des plis formés dans des zones de chauffage, par tubes radiants, de lignes de traitement thermique en continu de bandes métalliques, telles que des lignes de recuit ou de galvanisation, lesdites bandes, dans lesdits fours passant sur des rouleaux de transport et/ou de renvoi, ledit procédé qui consiste à modifier l'état thermique des rouleaux étant caractérisé en ce que ladite modification est réalisée directement par modulation du chauffage desdits tubes radiants (4) situés au voisinage des rouleaux (2), en contrôlant directement le flux thermique émis par les tubes radiants vers les rouleaux. <IMAGE>

IPC 1-7

C21D 9/56

IPC 8 full level

F23D 14/12 (2006.01); **C21D 9/52** (2006.01); **C21D 9/56** (2006.01); **C21D 9/567** (2006.01); **F23C 3/00** (2006.01); **F23N 1/00** (2006.01); **F27D 7/02** (2006.01); **F27D 7/06** (2006.01)

CPC (source: EP KR US)

C21D 9/562 (2013.01 - EP US); **C21D 9/563** (2013.01 - EP US); **C21D 9/567** (2013.01 - KR)

Citation (search report)

- [A] EP 0545768 A1 19930609 - LORRAINE LAMINAGE [FR]
- [A] FR 2212916 A5 19740726 - ARMCO STEEL CORP [US]
- [X] PATENT ABSTRACTS OF JAPAN vol. 006, no. 158 (C - 120) 19 August 1982 (1982-08-19)
- [X] PATENT ABSTRACTS OF JAPAN vol. 1998, no. 01 30 January 1998 (1998-01-30)
- [A] PATENT ABSTRACTS OF JAPAN vol. 006, no. 202 (C - 129) 13 October 1982 (1982-10-13)

Cited by

FR2876709A1; FR2900661A1; EA014407B1; US8425225B2; WO2007125213A3

Designated contracting state (EPC)

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

DOCDB simple family (publication)

EP 1229138 A1 20020807; BR 0200268 A 20021008; CN 100478460 C 20090415; CN 1369569 A 20020918; DE 1229138 T1 20030109; ES 2180472 T1 20030216; FR 2820148 A1 20020802; FR 2820148 B1 20031031; JP 2002302719 A 20021018; KR 20020064159 A 20020807; US 2002104598 A1 20020808; US 6761778 B2 20040713

DOCDB simple family (application)

EP 02290100 A 20020115; BR 0200268 A 20020128; CN 02103242 A 20020130; DE 02290100 T 20020115; ES 02290100 T 20020115; FR 0101331 A 20010131; JP 2002018027 A 20020128; KR 20020004396 A 20020125; US 5827202 A 20020130