

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 29 June 2004

Case Number: T 1141/01 - 3.2.1

Application Number: 96116411.8

Publication Number: 0770433

IPC: B21B /46, C21D 9/00

Language of the proceedings: EN

Title of invention:

Method to roll strip and plate and rolling line which performs such method

Patentee:

DANIELI & C. OFFICINE MECCANICHE S.p.A.

Opponent:

VOEST-ALPINE Industrieanlagenbau GmbH & Co.

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

"Novelty (yes)"
"Inventive step (yes) after amendment"

Decisions cited:

-

Catchword:

-



Case Number: T 1141/01 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 29 June 2004

Appellant: DANIELI & C. OFFICINE MECCANICHE S.p.A.
(Proprietor of the patent) Via Nazionale, 19
I-33042 Buttrio (UD) (IT)

Representative: Petraz, Gilberto Luigi
GLP S.r.l.
Piazzale Cavedalis 6/2
I-33100 Udine (IT)

Respondent(s): VOEST-ALPINE Industrieanlagenbau GmbH & Co.
(Opponent) Turmstr. 44
AT-4020 Linz (AT)

Representative: VA TECH Patente GmbH & Co
Stahlstrasse 21 a
AT-4020 Linz (AT)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 11 September 2001
revoking European patent No. 0770433 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
A. Pignatelli

Summary of Facts and Submissions

- I. The appeal is directed against the decision posted 11 September 2001 to revoke European patent No. 0 770 433.
- II. The following prior art played a role during the appeal:
- D1 Publicity brochure "Direct production plant for quality strips", Danieli, September 1995
- D2 EP-A-0 625 383
- D6 DE-A-39 36 467.
- III. In its decision the Opposition Division found that the subject-matter of claims 1 and 10 as granted lacked novelty with respect to the disclosure of D1.
- IV. Upon appeal the appellant requested that the patent be maintained on the basis of amended claims. The respondent requested that the appeal be rejected.
- V. The Board summoned the parties to oral proceedings to be held on 29 June 2004. With a letter dated 27 May 2004 the respondent announced that it would not be represented at the oral proceedings.
- VI. In the oral proceedings the appellant requested that the patent be maintained on the basis of claims 1 to 11 and description as filed during the oral proceedings and the drawings as granted.

VIII. The claims according to the appellant's request filed during oral proceedings include independent claims directed to both a method and an apparatus, which read as follows and in which features additional to those in the corresponding granted claims are indicated in italics:

"1. Method to roll strip and plate starting from thin slabs produced by a continuous casting machine having two casting lines (11a, 11b), comprising the steps of shearing the thin slabs coming from the casting machine by means of a shears (15) to obtain segments of thin slabs of a desired size;
passing said segments of thin slabs through a roughing rolling mill stand (22);
descaling said segments of thin slabs by means of a descaling unit (21) *with stationary water walls delivering water at between about 300 m³/h and about 400 m³/h* disposed before said roughing rolling mill stand (22);
passing said segments of thin slabs through a tunnel furnace (24) disposed downstream of said roughing rolling mill stand (22);
passing said segments of thin slabs through a finishing train (12);
descaling said segments of thin slabs by means of another descaling unit (27) *with stationary water walls delivering water at between about 300 m³/h and about 400 m³/h* disposed before said finishing train (12);
feeding said two casting lines (11a, 11b) at the same time so as to obtain thin slabs at the same time and wherein the segments of the thin slabs, before reaching the descaling unit (21) associated to said roughing rolling mill stand (22), are fed to a traversing and

transfer system (20), cooperating with the movable parallel end modules (19a, 19b) of respective heating furnaces (18a, 18b) associated with each casting line, the traversing and transfer system (20) being able to position the end modules (19a, 19b) in an alternate sequence on the same axis of said roughing rolling mill stand (22) and finishing train (12), characterised by the following steps:

passing and accelerating said segments of thin slabs through the respective heating furnaces (18a, 18b) consisting of independent modules (19) having independent heating systems incorporated, every module (19) having a length at least equal to the length of each of said segments of slab sheared to size and being equipped with doors which can be opened at the ends of each module, said heating furnace (18) being disposed between said shears (15) and said descaling unit (21) associated to said rolling mill stand (22); and further descaling said segments of thin slabs by means of a further descaling unit (17) of a high pressure rotary type disposed before each heating furnace (18a, 18b) in cooperation with a rapid heating step."

"7. Rolling line to roll strip and plate starting from thin slabs, comprising in sequence a continuous casting machine having a ladle system (14) and two casting lines (11a, 11b), whereby the ladle system (14) is able to feed each casting line (11a, 11b) which cooperates at the same time with respective mould systems (13a, 13b), a shears (15) for shearing to size segments of said thin slabs, a descaling unit (21), a roughing rolling mill stand (22), a tunnel furnace (24), another descaling unit (27) and a finishing train (12) followed by a cooling zone (25) and by possible winding units

(26), and respective heating furnaces (18a, 18b) associated with each casting line and comprising modules of which at least the respective last downstream modules (19a, 19b) can be moved during the rolling cycle and are associated with a traversing and transfer system (20) able to position alternately, during the progress of the rolling cycle, the last downstream modules (19a, 19b) on the same axis as the roughing rolling mill stand (22) and the finishing train (12) characterised in that each casting line (11) comprises a further descaling unit (17) of a rotary type disposed downstream of said shears (15) for delivering water at a high pressure against the surfaces of said segments of thin slabs, and a heating furnace (18), structured with independent modules (19) having independent heating systems incorporated, every module (19) having a length at least equal to the length of each of said segments of slab sheared to size and being equipped with doors which can be opened at the ends of each module, said heating furnace (18) being disposed downstream of said further descaling unit (17) for heating and accelerating said segments of thin slabs, one of said heating furnaces being positioned on the same axis of said roughing rolling mill stand (22) and of said finishing train (12)."

Claims 2 to 6 and 8 to 11 relate to features additional to those of the subject-matter of claims 1 and 7.

VIII. The appellant's arguments can be summarised as follows:

The Opposition Division was wrong to find that the subject-matter of the independent claims as granted lacked novelty with respect to D1 because the latter does not disclose the feature of a rotary descaler.

The subject-matter of the claims as amended also involves an inventive step in the light of the cited prior art. The heating furnaces of D1 may be of modular construction but the features of the modules having independent heating systems, doors at each end and a length which is at least equal to the length of the segments of slab are not known in the cited prior art. These features permit the modules accumulating in each of the two heating furnaces to be retained in a closed environment with different temperatures in each module.

IX. The respondent essentially rebutted the appellant's arguments as follows:

Rotary descalers having the characteristics as defined in the independent claims are known from D2. Moreover, they are provided in a position within the sequence through which the slabs pass which corresponds to that in D1 which merely mentions the use of "descalers".

Modular construction of furnaces is already known, as evidenced by D6 and the inclusion of such a feature in D1 does not involve an inventive step.

Reasons for the Decision

Amendments

1. Claim 1 essentially has been amended by inclusion of the following features which are disclosed in the application as originally filed as follows:
 - two casting lines, page 5, lines 30 to 33;
 - descaling units (21) and (27) *with stationary water walls delivering water at between about 300 m³/h and about 400 m³/h*, claim 8;
 - *wherein the segments of the thin slabs ... finishing train (12)*, claim 2;
 - *independent modules (19) having independent heating systems ... with doors which can be opened at the ends of each module*, page 4, lines 19 to 21 and page 6, line 31 to page 7, line 4;
 - descaling unit (17) of a *high pressure rotary type* disposed before each heating furnace (18a, 18b) *in cooperation with a rapid heating step*, page 4, lines 10 to 18.

Features added to the subject-matter of claim 7 are disclosed in the application as originally filed as follows:

- two casting lines, page 5, lines 30 to 33;

- *whereby the ladle system (14) is able to feed each casting line (11a, 11b) which cooperates at the same time with respective mould systems, claim 14;*
- *respective heating furnaces ... and the finishing train, page 4, lines 29 to 33 and claim 15;*
- *independent modules (19) having independent heating systems ... with doors which can be opened at the ends of each module, page 4, lines 19 to 21 and page 6, line 31 to page 7, line 4.*

Amendments to the description and dependent claims are limited to those necessary for consistency with the independent claims.

- 1.1 The amendments therefore do not contravene the requirement of Article 123(2) EPC. Moreover, since all of the amendments to the independent claims further limit the claimed subject-matter the requirement of Article 123(3) EPC also is not contravened.

Patentability

2. The parties are in agreement that the closest prior art is disclosed by the brochure D1. This prior art relates to a strip mill having a continuous casting machine supplying two casting lines producing slabs having a thickness in the range 70 to 90 mm. The slabs from the casting lines are fed through a respective one of two further lines each comprising in sequence a shear device, "low flow rate" descaling unit and heating furnace. After leaving the respective heating furnaces the segmented slabs pass through a single rolling line

which comprises, in sequence, a descaling unit, a roughing mill, a further furnace, a further descaling unit and a finishing mill.

2.1 The subject-matter of claim 1 differs from the teaching which the skilled person derives from D1 by the following features:

- the descaling units disposed before the roughing rolling mill stand and the finishing train are of the type having stationary water walls delivering water at between about 300 m³/h and about 400 m³/h;
- the respective heating furnaces consist of independent modules having independent heating systems, every module having a length at least equal to the length of each of the segments of slab sheared to size and being equipped with doors which can be opened at the ends of each module; and
- the descaling unit disposed before each heating furnace is of a high pressure rotary type.

3. In the method according to the present patent the continuous casting machine delivers a constant supply of strip which is fed into both of the two lines containing the heating furnaces. The segments are delivered alternately from each line into the single rolling line whereby when a segment has left the last module of the furnace in one line that module is exchanged with the corresponding module in the other line for delivery of a segment from that corresponding module. The segments are accelerated through the heating furnace whereby the continuous supply of strip

at a lower speed from the two casting lines is able to provide a continual supply of slabs at a higher speed to the rolling line. As part of this process a reserve feed of slabs is created in each of the heating furnaces. As defined in claim 1 the furnaces are independent modules having doors located at the ends, whereby the segments can be held within a closed environment and the independent heating systems allow the temperature in each module to be tailored to the time that the segments remain inside each module. As a result, the modules may be operated independently and the claimed features enable the conditions in the heating furnace to be optimised according to the needs of the product.

3.1 The available prior art contains no disclosure of a heating furnace as claimed, comprising independent modules with independent heating systems and end doors. D6 relates merely to the modular construction of a furnace thereby avoiding the difficulties conventionally arising from the need to install and insulate a complete unit. There is no mention either of the particular problems encountered in the coupling of a continuous casting machine with a rolling line or of the combination of modules which may be isolated from each other and independently heated. For these reasons there is nothing in the cited state of the art which could lead the skilled person to the subject-matter of claim 1.

3.2 D1 is silent as regards the particular type of descaling unit to be used in each of the three positions. The various descaling units defined in claim 1 are types known *per se* in the art. In

particular, D2 discloses the use of a rotary high pressure descaling unit located directly upstream of a heating furnace for the treatment of slabs in the range of 60 to 130 mm thickness, which falls within the range of 70 to 90 mm disclosed in D1, and a high speed descaling unit having static nozzles and being located directly upstream of a rolling train. However, D2 does not disclose the water delivery rates specified for each of the descaling units in claim 1. Given the conclusion reached in 3.1 above with regard to the non-obvious nature of the claimed heating furnace structure the Board sees no reason to go further into the question of whether the features of the descaling units as defined in claim 1 have any independent inventive significance.

4. In as far as the apparatus claim 7 contains the feature of the heating furnace being formed by independent modules having independent heating systems, a length at least equal to the length of the segments of slab sheared to size and being equipped with doors at their ends, the subject-matter is not obvious for reasons corresponding to those as set out under 3 and 3.1 above.
5. The Board concludes from the above that the subject-matter of claims 1 and 7 is both novel (Article 54 EPC) and involves an inventive step (Article 56 EPC). This conclusion applies equally to claims 2 to 6 and 8 to 11 since they contain all features of the respective independent claims to which they refer.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance department with the order to maintain the patent with the following documents:
 - claims 1 to 11 and description as filed during the oral proceedings;
 - drawings as granted.

The Registrar:

The Chairman:

A. Vottner

S. Crane