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**Datasheet for the decision  
of 17 June 2021**

**Case Number:** T 2213/17 - 3.2.03

**Application Number:** 12705405.4

**Publication Number:** 2667982

**IPC:** B21B1/46, B21B13/22

**Language of the proceedings:** EN

**Title of invention:**

ROLLING METHOD FOR STRIP AND CORRESPONDING ROLLING LINE

**Patent Proprietor:**

Danieli & C. Officine Meccaniche SpA

**Opponent:**

SMS group GmbH

**Headword:**

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - ex post facto analysis - non-obvious  
modification

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 2213/17 - 3.2.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.03**  
**of 17 June 2021**

**Appellant:** SMS group GmbH  
(Opponent) Eduard-Schloemann-Strasse 4  
40237 Düsseldorf (DE)

**Representative:** Klüppel, Walter  
Hemmerich & Kollegen  
Patentanwälte  
Hammerstraße 2  
57072 Siegen (DE)

**Respondent:** Danieli & C. Officine Meccaniche SpA  
(Patent Proprietor) Via Nazionale 41  
33042 Buttrio (Udine) (IT)

**Representative:** Petraz, Gilberto Luigi  
GLP S.r.l.  
Viale Europa Unita, 171  
33100 Udine (IT)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 19 July 2017  
rejecting the opposition filed against European  
patent No. 2667982 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** C. Herberhold  
**Members:** B. Miller  
D. Prietzel-Funk

## **Summary of Facts and Submissions**

- I. European patent No. 2 667 982 B1 ("the patent") relates to a rolling method and plant with a Steckel reversing rolling stand.
- II. An opposition was filed against the patent, based on the grounds of Article 100(a) EPC together with Article 56 EPC.  
The opposition division found that this ground of opposition did not prejudice the maintenance of the patent and decided to reject the opposition.
- III. This decision was appealed by the opponent ("the appellant"). They requested that the decision under appeal be set aside and the patent be revoked.
- IV. The proprietor ("the respondent") requested that the appeal be dismissed.
- V. Wording of the independent claims as granted

Claim 1 as granted reads:

"Rolling method for the production of flat products (111) with low productivity, comprising a continuous casting step in a crystallizer (17) at a speed comprised between 3.5 m/min and 6 m/min of a thin slab (11) with a thickness comprised between 25 mm and 50 mm,  
a roughing step to reduce the thickness in at least one forming stand or roughing stand (20), to a value comprised between 10 mm and 40 mm, and suitable for winding,

a rolling step,  
a cooling step and  
a winding step of the final product, in order to  
obtain a final product comprised between 1-1.2 mm and  
16 mm

**characterized in that**

the method further comprises a rapid heating step using  
induction in order to at least restore the temperature  
lost in the segment downstream of casting and in the  
roughing step,

a winding/unwinding step in a winding/unwinding device  
(34) with two mandrels, which is carried out after the  
rapid heating step,

wherein the rolling step is made in a Steckel type  
rolling unit (22) with two reversing type stands (23a,  
23b) of the product unwound by the winding/unwinding  
device (34) comprising not more than three double  
rolling passes, or two inversions,

wherein in each of the rolling passes the percentage  
reduction in the first stand (23a) of the Steckel  
rolling unit (22) with two stands is comprised between  
25% and 50%, whereas the percentage reduction in the  
second stand (23b) of the Steckel rolling unit (22) is  
comprised between 0% and 30%."

Claim 11 as granted reads:

"Rolling line for the production of flat products (111)  
with low productivity adopting the method of claim 1,  
comprising

a casting machine (12) with a crystallizer (17)  
suitable to continuously cast a thin slab (11) at low  
speed, comprised between about 3.5 m/min and 6 m/min,  
a rapid heating unit and  
a Steckel type rolling unit (22) comprising two  
combined stands (23a, 23b) of the reversing type,

at least a forming stand or roughing stand (20), able to reduce the thickness of the just solidified material, directly connected immediately at exit from the continuous casting machine (12) and upstream of the rapid heating unit,

**characterized in that**

the rapid heating unit is an inductor furnace (18) configured at least to recover the losses of temperature deriving from the passage in the roughing stand (20), and downstream of said inductor furnace (18) there is a winding/unwinding device (34) with at least two mandrels (34a, 34b) able to selectively and alternately perform the function of winding the bar arriving from casting and of unwinding it in order to feed it to the Steckel rolling unit (22)."

VI. State of the art

The following documents cited already during the opposition proceedings are referred to in this decision:

E1: WO 00/10741 A1;  
E2: EP 0 576 890 B1;  
E3: EP 0 937 512 A1;  
E6: US 5 647 236.

VII. With the summons to oral proceedings, the Board sent a communication pursuant to Articles 15(1) and 17(2) of the Rules of Procedure of the Boards of Appeal (RPBA 2020) indicating to the parties its preliminary opinion, that the arguments of the appellant did not put into question the validity of the reasoning in the contested decision.

VIII. Oral proceedings were held on 17 June 2021 by videoconference with the consent of both parties.

IX. The appellant's arguments, as far as they are relevant for this decision, can be summarised as follows.

(a) Obviousness of the subject-matter of claim 11 starting from figures 1 and 2 of E1

The subject-matter of claim 11 differed from the disclosure of E1 in that the rolling line comprised

a Steckel type rolling unit (22) comprising two combined stands (23a, 23b) of the reversing type, and a winding/unwinding device (34) with at least two mandrels (34a, 34b).

Steckel type rolling units as well as winding/unwinding devices were known in the art and from E1 itself and the skilled person would use them as needed without requiring inventive skills.

(b) Obviousness of the subject-matter of claim 11 starting from figure 3 of E1

Figure 1 of the patent demonstrated that the expression "directly connected immediately at the exit" in claim 1 had to be interpreted broadly, since the casting machine 12 was not directly and immediately connected to the roughing stand 20. Rather a tundish, a crystallizer 17 and a descaler 16 were positioned between the casting machine 12 and the roughing stand 20.

Figure 3 of E1 disclosed a rolling unit comprising a casting machine followed by a heating element 35 and a roughing stand 17. In view of the required broad interpretation of the term "directly connected" in the patent (see above) the casting machine was immediately connected to a roughing stand in the sense of claim 11.

Thus, the subject-matter of claim 11 differed from the disclosure of E1 only in that the rolling line comprised an inductor furnace.

It was common practice to use an inductor furnace in rolling lines as evidenced by E2, E3 and E6. Hence it came within routine modification to replace a heating element in the rolling line of E1 by an inductor furnace. Further, it was common practice for a skilled person to place a heating element where needed. This was also confirmed by E1 itself, which disclosed in figure 3 a rolling line with several heating elements. It was therefore obvious for the skilled person to make use of a further rapid heating element in the form of an inductor furnace upstream of the storage device 26 in the rolling line of figure 3 of E1 when needed.

(c) Obviousness of the subject-matter of claim 1

With regard to the method defined in claim 1 of the patent the same arguments applied as for claim 11.



X. The respondent's respective arguments can be summarised as follows.

(a) Obviousness of the subject-matter of claim 11 starting from figures 1 and 2 of E1

E1 disclosed in figures 1 to 3 different alternative embodiments with different lay-outs, different components and different operation modes. The argument of the appellant was therefore based on a combination of alternative embodiments and therefore did not correctly take into account the disclosure of E1.

(b) Obviousness of the subject-matter of claim 11 starting from figure 3 of E1

Figure 1 of the patent confirmed that the casting machine 12 - which included the tundish and the crystallizer 17 - was "directly connected immediately at the exit" to the roughing stand 20 - which included the descaler unit 16.

Figure 3 of E1 by contrast disclosed a rolling unit comprising a casting machine directly followed by a heating element 35.

The subject-matter of claim 11 thus differed from the disclosure of E3 in that the rolling line comprised a

i) roughing stand directly connected immediately at exit from the continuous casting machine and upstream of the rapid heating unit and

ii) an inductor furnace configured at least to recover

the losses of temperature deriving from the passage in the roughing stand and positioned upstream of a winding/unwinding device with at least two mandrels.

E1 did not provide any incentive to make use of a further inductor furnace downstream of the roughing stand and upstream of the coiler furnaces 37/38 forming an intermediate storage 26.

None of the further cited documents disclosed a rolling unit comprising an inductor furnace positioned between a roughing stand and a winding/unwinding device.

Hence the subject-matter of claim 11 was not rendered obvious by the cited prior art.

(c) Obviousness of the subject-matter of claim 1

With regard to method defined in claim 1 of the patent the same arguments applied as for claim 11.

## **Reasons for the Decision**

Article 100 (a) EPC in combination with Article 56 EPC

1. The patent relates to a method for casting and rolling molten steel and to a production line for manufacturing steel strips by this method.

E1 is directed to the same purpose. Therefore the Board does not see any reason to deviate from the finding in point II.3 on page 3 of the contested decision and also presented by the appellant, that E1

represents a suitable starting point for the assessment of inventive step.

2. E1 discloses in figures 1 to 3 three different and alternative production lines for obtaining hot rolled steel strips, each comprising a casting machine, a roughing stand, a rolling mill and a cooling unit.
3. Obviousness of the subject-matter of claim 11 starting from figures 1 and 2 of E1

With regard to the rolling lines disclosed in figures 1 and 2 the appellant repeated on pages 4 to 6 of the statement setting out the grounds of appeal its arguments as already submitted in the notice of opposition. It concluded that the subject-matter of claim 11 differs from the disclosure in figures 1 and 2 of E1 in that the rolling line comprises

a Steckel type rolling unit (22) comprising two combined stands (23a, 23b) of the reversing type, and a winding/unwinding device (34) with at least two mandrels (34a, 34b).

In the communication pursuant to Articles 15(1) and 17(2) RPBA 2020 the Board informed the parties that:

- i) this argument was not found to be convincing, since it was based on a combination of independent embodiments illustrated in the figures of E1;
- ii) figures 1 and 2 of E1 disclosed a continuous rolling train without a reversible rolling unit of the Steckel type and therefore were not as relevant as the embodiment of figure 3 with respect to claim 11 of the patent.

The preliminary opinion by the Board was not contested by the appellant during the oral proceedings before the Board. Therefore there is no need to discuss this issue in further detail.

4. Obviousness of the subject-matter of claim 11 starting from figure 3 of E1

4.1 E1 discloses in figure 3 a rolling line comprising a casting machine 1, a roughing stand 17, a Steckel-type unit (roll stands 30,31 in combination with coiler furnaces 33, 37/38) and heating elements 35 and 20.

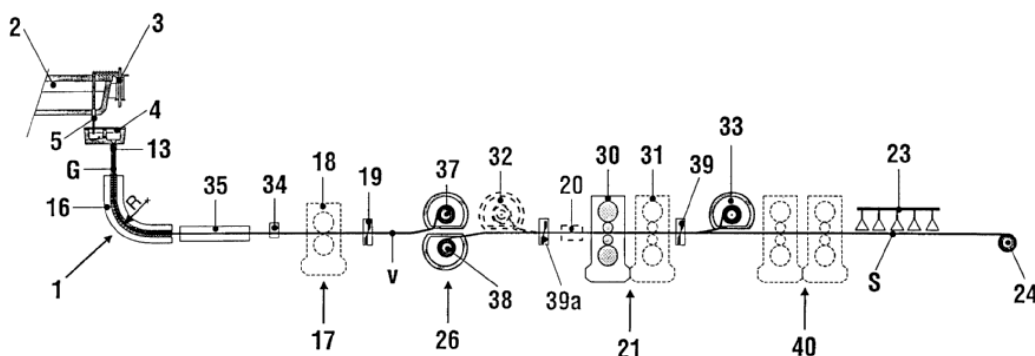


Fig 3

4.2 It is undisputed that the subject-matter of claim 11 differs from the embodiment according to figure 3 at least in that the rolling line comprises an inductor furnace which is

- i) configured at least to recover the losses of temperature deriving from the passage in the roughing stand and
- ii) positioned upstream of a winding/unwinding device with at least two mandrels able to selectively and alternately perform the function of winding the bar arriving from casting.

- 4.3 It is further undisputed that inductor furnaces are known in the art. This has been further illustrated by the appellant by reference to the induction heating element 22 in figure 5 and paragraph [0035] of E3.
- 4.4 However, simply replacing one of the heating elements 35 or 20 in the rolling line according to figure 3 of E1 by an inductor furnace, as suggested by the appellant, does not result in a rolling line according to claim 1, since heating element 35 is not positioned downstream of the roughing stand and heating element 20 is not positioned upstream but rather downstream of a winding/unwinding device with at least two mandrels for winding the bar arriving from casting.
- 4.5 Replacing the further heating element disclosed in figure 3 of E1, i.e. replacing the coiler furnaces 37,38, is also not an obvious option for the skilled person, since the storage functionality provided by the coiler furnaces is an essential requirement for performing the rolling method disclosed on page 14, last paragraph and page 15 of E1 in relation to the embodiment shown in figure 3. Moreover, this modification would also not result in a rolling line according to claim 11, since it would lack a winding/unwinding device with at least two mandrels.
- 4.6 As far as the appellant argues that the skilled person would simply place an inductor furnace wherever needed, the Board considers this argument to be based on hindsight.

Starting from the embodiment in figure 3 of E1 the skilled person has no incentive to position an inductor furnace directly upstream of a coiler furnace. Also in

the corresponding description for the production line according to figure 3 on page 14, last paragraph and page 15, E1 does not provide any incentive to place a further heating element between the roughing stand 17 and the coiler furnaces 37/38. On the contrary, the coiler furnaces 37/38 of the storage element 26 of E1 are already heating elements. Hence, there is no reason for the skilled person to even assume that a further inductor furnace would be required downstream of the roughing stand 17.

4.7 This incentive is also not provided for by the further documents E2, E3 and E6 referred to by the appellant.

E2 discloses a winding/unwinding assembly whose walls can be covered by heating means, see column 8, lines 10 to 13. E2, however, does not disclose this assembly in combination with an inductor furnace but rather in combination with heating means 50 consisting of electric resistors, see column 8, line 11.

E6 discloses a mill stand comprising a coiler furnace 18, but does not disclose an inductor furnace.

E2 and E6 therefore neither disclose an inductor furnace nor provide an incentive to place an inductor furnace upstream of a winding/unwinding device and downstream of the roughing mill.

E3 discloses in figures 6 to 11 production lines for steel strips comprising an inductor furnace between the casting machine and the roughing mill.

The position of the inductor furnace in the production lines of E3 corresponds to the position of the heating

element 35 in the rolling line according to figure 3 of E1.

Hence, also E3 does not provide an incentive to introduce a further inductor furnace between the roughing stand 17 and the coiler furnaces 37/38 of the rolling line of figure 3 of E1.

In summary, none of the arguments presented by the appellant demonstrates that a rolling line comprising an inductor furnace at the position as defined by claim 11 of the patent was obvious starting from the teaching in E1.

- 4.8 In view of the finding above, it can remain open whether in figure 3 of E1 the roughing stand 17 is "directly connected immediately at exit" from the continuous casting machine 12 and upstream of a rapid heating unit as defined in claim 11 of the patent.
5. In accordance with the submissions of both parties, the same arguments as for claim 11 apply for the subject-matter of claim 1.
6. The Board therefore concludes that the subject-matter of the claims as granted is not rendered obvious by the cited prior art.

In agreement with the finding in both points II.3 on pages 3 to 5 of the contested decision the Board is of the opinion that the ground of opposition pursuant to Article 100(a) EPC in combination with Article 56 EPC does not prejudice the maintenance of the patent.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

C. Herberhold

Decision electronically authenticated