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**Datasheet for the decision
of 21 December 2009**

Case Number: T 1550/07 - 3.2.06

Application Number: 00901321.0

Publication Number: 1062061

IPC: B21B 39/12

Language of the proceedings: EN

Title of invention:

Hot rolling mill for thin strip with high-speed winding of individual strips

Patentee:

SMS DEMAG INNSE S.p.A.

Opponent:

Siemens AG

Headword:

-

Relevant legal provisions:

EPC Art. 54(3)

Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Novelty and inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1550/07 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 21 December 2009

Appellant: Siemens AG
(Opponent) Abteilung: CT IP TS
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Representative: Diez, Michael

Respondent: SMS DEMAG INNSE S.p.A.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 18 July 2007
rejecting the opposition filed against European
patent No. 1062061 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: P. Alting Van Geusau
Members: M. Harrison
W. Sekretaruk

Summary of Facts and Submissions

- I. The appellant (opponent) filed an appeal against the decision of the opposition division rejecting the opposition against European patent No. 1 062 061.
- II. The appellant requested revocation of the patent and in support of its arguments relied on the following documents:
- D1: EP-A-1 016 471
 - D2: DE-B-1 153 708
 - D4: DE-A-32 24 621
 - D5: US-A-5 269 166
 - D6: US-A-4 761 983
 - D9: JP-A-10 099916
 - D10: JP-A-10 128438
 - D11: GB-A-2 232 368
- III. The respondent (proprietor) requested dismissal of the appeal as a main request, or maintenance of the patent in an amended form based on a first or second auxiliary request.
- IV. Following a summons to oral proceedings, the Board subsequently issued a communication stating its provisional opinion, in accordance with which the subject matter of claim 1 was provisionally found to be novel compared to the disclosure in D1 and that this subject matter involved an inventive step when starting from D2 as the closest prior art.
- V. With its submission of 20 November 2009, the respondent filed claims of its first and second auxiliary requests.

VI. With its letter dated 23 November 2009, the appellant filed further arguments, as well as a new document

D12: printout of internet page: <http://www.sms-siemag.com/en/1554.html> from 24 November 2009.

VII. During the oral proceedings, the appellant confirmed its request for revocation of the patent and the respondent confirmed its requests for dismissal of the appeal or alternatively maintenance of the patent on the basis of one of the auxiliary requests 1 or 2, filed on 20 November 2009.

VIII. Claim 1, the sole independent claim of the granted patent, reads as follows:

"A hot rolling mill for thin strips (N), comprising an output section (1) extending between a final rolling stand (2) and at least one winding reel (10), a driven rollers way (3) disposed longitudinally with respect to this section and along which the strip is fed, means (5, 6) of the aerodynamic type provided along said output section to prevent the strip from being lifted from the rollers way, characterized in that: the output section comprises a drive unit (9) disposed along the rollers way (3) and before said at least one winding reel (10), and wherein the winding reel (10) is disposed at a greater height than the rollers way (3) and the drive unit is of the type that can be oriented to deflect the strips (N) towards the winding reel."

IX. The arguments of the appellant may be summarised as follows:

D1 was prejudicial to novelty of the subject matter of claim 1 in respect of Article 54(3) EPC. One feature disputed by the respondent as being disclosed in D1, stated that "the drive unit is of the type that can be oriented to deflect the strips (N) towards the winding reel". This was however disclosed in D1 by the drive roller pair 64 of Fig. 19 acting together with one or more of the elements 68, 69 and 70 to cause the strip to be deflected to the raised winding reel. The term "drive unit" had to be interpreted broadly since it was not limited in the claim and could therefore reasonably include not only the roller pair 64 but also any one or more of the elements 68, 69 and 70 in combination therewith. Although these elements were not stated explicitly as being part of the same unit as the roller pair 64, they fulfilled, together with the roller pair 64, the claimed technical function. The further feature of the defined aerodynamic means, alleged by the respondent not to be known from D1, was shown in e.g. Figures 5, 6 and 7. The drive roller type disclosed in D9 or D10 was also of the type shown in the patent and the skilled person would implicitly understand that this type of deflection drive roller was the type which would be used in D1, even if the drive roller pair 64 alone was considered to be the only "drive unit" of claim 1.

With respect to inventive step and compared to the closest prior art D2, claim 1 differed in view of the features:

1(e): "the winding reel is disposed at a greater height than the rollers way"; and

1(f): "the drive unit is of the type that can be oriented to deflect the strips (N) towards the winding reel."

These features provided no synergy and thus separate technical problems were involved; feature 1(e) related to improving flexibility in the construction while feature 1(f) related to providing suitable means for directing the strip. The solution to both problems was known from e.g. D11, which disclosed a winding reel (winder) capable of being placed anywhere along the roller table, as well as a drive unit according to feature 1(f). Further, D11 was not restricted to reversing mills because heating of the winder mandrel was only preferable in D11 whereas in a reversing mill it would be heated. To solve these separate problems, the skilled person would thus combine the teaching of D11 with D2. If the drive unit were interpreted more restrictively, this was anyway known from D4 where it was used for the same purpose. Considering D4 for combination with D2, D4 also taught the skilled person to solve both problems since it had a winder placed above the roller table and a drive unit of the same type as in the embodiment of the patent. Further, it was generally recognised by a skilled person that the use of reversing mills such as those in D4 allowed flexibility because it avoided alteration of any foundation structures. The definition of the winder being in an output section in claim 1 did not prevent a skilled person from using the winder of D4 or D11 in a device according to D2, since each of these was in an output section due to the fact that the last rolling pass was performed in the reversing mill between the

winders. This was confirmed by D12. The device of D4 was suitable, with only minor modifications well known to a skilled person, to be used in the output section of a mill of a different type than a reversing mill. Although inventive step had been addressed with regard to separate technical problems, the same arguments would apply even if a common problem were considered. The subject matter of claim 1 therefore lacked an inventive step. Additionally, D9 and D10 disclosed deflection of strips by drive units, albeit downwards, from the roller way, in mills of a different type than reversing mills, while D5 and D6 were further examples of reversing mills like D4 in which the strips were deflected upwards to a winder. D9 or D10 would be combined with D2 and D11, D4, D5 or D6, if necessary, to arrive at the subject matter of claim 1 without inventive skill.

X. The arguments of the respondent may be summarised as follows:

D1 lacked at least feature 1(f), because the elements 68, 69 and 70 were not part of the drive unit which deflected the strips upwards to the winding reel. Thus, the subject matter of claim 1 was novel. D1 also lacked means of aerodynamic type acting in the manner defined in claim 1.

Concerning inventive step and starting with D2 as the closest prior art, the problem to be solved was to create an alternative means of providing the same effect as continuous rolling. This was clear from paragraphs [0005], [0012] and [0021], because one winding reel was positioned above the roller way and

another would be positioned below it as shown in Figs. 1 and 2. Even if the problem to be solved were a different problem related to the modification of the output section, neither D4 nor D11 solved such a problem, since each related to a reversing mill and not to an output section as defined in claim 1. Nor did D4 or D11 given any indication towards solving a problem involving the output section of a mill, and the winders of D4 and D11 were not even suitable for this purpose without modification which would only be done in hindsight. D9 and D10 merely showed a downward deflection of the sheets as known already from D2. The subject matter of claim 1 was thus not obvious.

Reasons for the Decision

1. *Novelty*
 - 1.1 D1 does not disclose at least the feature that the "drive unit is of the type that can be oriented to deflect the strips towards the winding reel", hereafter referred to as "feature 1(f)".
 - 1.2 In the embodiment of Figure 19 as referred to by the appellant, (see also paragraph [0073] and [0074]), the rolled metal strips are only driven towards the winder by the pinch rolls 64 which provide, as known per se, a frictional driving force. Whilst the snubber roll 68, the strip passing device 69 and strip trailing end guide 70 either guide and/or maintain the strip deflected upwards towards the winding reel 66a after it has been moved along a circular path in the direction of arrow 71 (see paragraph [0071]) to its raised

position, thereby taking the strip already wound thereon with it, the elements 68, 69 and 70 do not act to "drive" the rolled metal strips. Thus the only "drive unit" disclosed in D1 is that constituted by the pinch rolls 64. Nor are any of the elements 68, 69 or 70 associated with the pinch rolls 64 in a way that could be considered to make them part of that same drive unit; they are merely elements downstream thereof. The terminology used in paragraph [0073] of D1 to describe the function of the strip passing device 69 as "drawing in the strip by an airflow" also implies nothing beyond merely a guide function.

- 1.3 Although the term "drive unit" in claim 1 is not limited to a drive roller pair having a particular roller orientation providing deflection upwards as shown in the embodiment of the patent, this does not alter the fact that D1 fails to disclose a driving action being performed by elements 68, 69 or 70. Likewise, although several elements may constitute a drive unit, irrespective of whether these are in a common housing, the Board finds that the elements 68, 69 and 70 are not elements of any such drive unit but are separate elements which merely maintain an already driven and deflected strip in a particular deflected orientation.

Also, the argument that the elements together perform the same technical function as feature 1(f), and thus should be considered as constituting the same drive unit, is found unconvincing. Merely because several elements are present which together may perform the function intended as a result of feature 1(f), does not

make these part of the same unit, let alone part of a drive unit.

1.4 D1 also contains no disclosure that the drive roller pair (pinch rollers 64) can itself be oriented to deflect the strips towards the winding reel 66a. D1 only discloses a single orientation of the pinch rollers 64 which is such that, in the position shown in Fig. 19 (see also paragraph [0071]), the strip P is directed horizontally towards winder 66a while this is in its lower position. Consequently, no disclosure in D1, either explicit or implicit, indicates that the roller pair 64 is "of the type that can be oriented to deflect the strip" towards the winder.

1.5 The appellant also argued that D9 or D10 disclosed such deflecting rollers and that these would be understood by a skilled person to be the type of drive rollers that would be used in D1 where pinch roller 64 was indicated. However this is pure speculation. As explained in D1, the winding reel 66a is rotated to its upper position and it is this rotation which causes the deflection of the steel strips to a higher position. D1 is also silent as regards any possible orienting of the pinch rollers 64 in this regard, and neither D9 nor D10 is referred to in D1, whereby D9 and D10 are not part of the disclosure of D1.

1.6 Although there was disagreement between the parties as to whether a further feature of claim 1 was known from D1, this does not require further consideration since it suffices that a single feature of claim 1 is found to differ from the prior art for establishing the presence of novelty in claimed subject matter.

1.7 The subject matter of claim 1 is thus novel compared to the disclosure in D1. Since no other document has been cited against the claims with respect to novelty, the requirements of Article 54 EPC are therefore met with regard to the cited prior art.

2. *Inventive step*

2.1 For the assessment of inventive step, D2 is considered by the parties as being the closest prior art. The Board finds no reason to disagree with this.

2.2 There is also no dispute between the parties that the features of claim 1 which differ from D2 are features 1(e) and 1(f) below.

1(e): "the winding reel is disposed at a greater height than the rollers way"; and

1(f): "the drive unit is of the type that can be oriented to deflect the strips (N) towards the winding reel."

2.3 In regard to the objective problem to be solved with respect to D2, the appellant argued that because features 1(e) and 1(f) provided no synergy, each feature should be considered as solving a separate, partial, problem. Reference was made to the Guidelines C-IV 11.5. The respondent argued that the problem to be solved was to find an alternative way to achieve the same effect as continuous rolling.

2.4 However, in regard to the appellant's viewpoint, the Board finds that the features 1(e) and 1(f) are indeed functionally interrelated in that they concern the deflection of a steel strip by orientation of the drive unit so that the steel strip is fed not merely forwards but upwards to the raised winding reel position. Even though the Board is not bound by the Guidelines, it should be noted that features 1(e) and 1(f) do not define an aggregation or juxtaposition of features as referred to in Guidelines C-IV, 11.5.

As regards the respondent's viewpoint, the problem it proposes is found not to be objective, since the features of claim 1 do not provide a means which has the same effect as continuous rolling; the explanation given by the respondent that a second winding reel would be positioned below the roller table is merely a possibility to which the claim is not limited and paragraph [0021] cited by the respondent does not indicate that the roller depicted below the roller table is an additional winding reel, but merely an alternative position.

2.5 D2 (see e.g. Fig. 1) relates to a mill having an output section as defined in claim 1 extending between a final rolling stand and a winding reel, where means of the aerodynamic type are provided along the output section (see e.g. col. 3, line 17 to col. 4, line 10) and whereby the winder is placed below the level of the roller table ("rollers way" of claim 1). Thus the Board finds that a common problem is indeed solved by features 1(e) and 1(f) and that the problem relates to a mill for dealing with successive batches of thin strip as mentioned in paragraphs [0001], [0005], [0010],

[0012], [0032] and [0033] of the patent, whereby, with particular reference to paragraph [0020] of the patent, the objective problem is the provision of a winding device at an alternative location in the output section allowing easy fitting to existing plants of the type in claim 1 without modifying the foundations.

2.6 Although not stated explicitly, the coiler of D11, in accordance with the description of the winder type on page 1, lines 1 to 3, is found to relate to a reversing mill coiler, since it is stated as being a coiler for rolling strip "on and off the mandrel" and is provided with heating means.

Although page 4, lines 11 to 16 states that heating of the mandrel is "optional" and that the housing can "if desired" be "provided with heating means", this does not override the initial statement concerning the type of winder involved. Also, the entire structure is described including internal heat insulating means 7 and additional heat insulating means on the flap external surfaces (see page 5, lines 23 to 25), which would be atypical for any coiler not used in a reversing mill. Also, the invention in D11 concerns reducing heat losses during coiling (see page 1, line 17 to page 2, line 6 and page 2, line 27 to page 3, line 6) which is seemingly only in line with the winder being one used in a reversing mill. Further, nothing in D11 discloses an arrangement by which the wound coil can be removed from the device, as would be required when the coiler was of a type for use in an output section of the type defined in claim 1. Further, whilst D11 states on page 2, lines 6 to 10 that another object of the invention is to enable arrangement of the

coiler at any point on the roller table, it appears only in hindsight that this would lead to a conclusion that "any point" also means a point in an output section not in a reversing mill.

As such, there is no teaching in D11 which motivates the skilled person to use such a coiler in an output section, i.e. that section after the final rolling stand, which is of the type using aerodynamic means to prevent the strip from being lifted (as defined in claim 1). Already at the outset, the Board is not convinced that D11 provides a teaching to a skilled person to position the coiler above the rollers way in an output section as defined, unless hindsight of the claimed invention is used, because reversing mill coilers are used for a different purpose, namely for receiving rolled sheet from a rolling stand intermediate two coilers and maintaining this in a heated condition between successive rolling passes.

- 2.7 Further, there is also no drive unit in D11 which corresponds to feature 1(f), since deflection of the strip in D11 is caused solely by the free end 17 of pivot flap 13 passing below the rollers way to alter the strip route such that it is forced towards the mandrel in the coiler (see e.g. page 5, lines 1 to 8). Also no orientation of the drive means is disclosed, it being noted that the pivot flap does not form a part of the drive means; the drive means being formed in D11 solely by the pinch rollers (see e.g. Fig. 1, right hand end).

- 2.8 The skilled person would therefore not combine the teaching of D11 with D2 to arrive at the subject matter of claim 1 unless inventive skill were used.
- 2.9 D4 discloses a coiler in a reversing mill including a drive roller pair 19 which drives the strips onto a roller bridge 15 when the upper roller of the roller pair 19 is forced via a cylinder 20 against the lower roller (see e.g. page 8, second complete paragraph). Due to the offset of the roller axes of the roller pair 19, the strip will be deflected upwards due to the action of the cylinder 20 which acts to orient the upper roll into a position forcing both the rolls of the roller pair 19 together. The drive unit is therefore found by the Board to be "of the type that can be oriented to deflect the strips towards the winding reel", which thus corresponds to feature 1(f).
- 2.10 Due to D4 being a reversing mill however, and since no other disclosure is present of wider applications for such coilers, the same reasoning applies to D4 as to D11, namely that only with hindsight would a skilled person consider placing the coiler of a reversing mill of D4 into an output section of a mill as in D2, since the coilers have different purposes and are also constructed differently.
- 2.11 The skilled person would therefore not combine the teaching of D4 with D2 to arrive at the subject matter of claim 1 unless inventive skill were used.
- 2.12 The appellant argued that nothing prevented a skilled person from using the winder in D4 or D11 in a device according to D2, since each of these was in an output

section due to the fact that the last rolling pass was performed in the reversing mill between the winders. However, the Board finds this argument unconvincing. The notion that nothing prevents a skilled person from doing something is merely the same as stating that a skilled person "could" do something, but provides no indication of why a skilled person "would" adopt a particular change when solving a technical problem. Further, the appellant's statement about the coiler in D4 or D11 being in an output section ignores the fact that claim 1 defines a specific output section, including the use aerodynamic means, which distances the subject matter of the claim from the intermediate roller table between coilers in reversing mills. As also stated previously, the coilers of D4 and D11 would also need adaptation if these were to be used as a coilers in such an output section of a mill.

Whether D12 provides evidence of a coiler being in the output section is considered irrelevant, since not only is D12 published too late for it to be considered as prior art, but it has anyway not been contested that a reversible rolling mill must allow finished material to be output after being stored in at least one of the coilers thereof. As already stated, claim 1 defines a specific output section which is not the same as an exit portion from a reversible rolling mill.

- 2.13 Whilst the appellant also argued that D4 and D11 were, by their very nature of being reversing mills, designed with coilers above the rollers way and thereby avoided alterations of the foundations and allowed easy fitting, this lacks relevance since the problem of ease of

fitting to an existing mill relates to a specific type of mill having an output section as defined in claim 1.

2.14 The appellant also argued that D9 and D10 each disclosed deflection of strips by drive units in different types of mills. Firstly however, D9 and D10 are each abstracts with a single drawing which do not disclose how exactly the metal strips are deflected towards the coilers, even if it might appear at first sight from the drawings that this is due to the type of drive roller arrangement. However, more importantly, each of the roller pairs deflects the metal strips downwards in some way from the roller table and thus the coilers are not something allowing easy fitting to existing plants such as in D2 where coilers below the roller table normally need to be placed within recesses, or wherein the entire roller assembly must be raised to allow such placement. Thus, even if it were disclosed in D9 and D10 that the drive means corresponded to feature 1(f) as such, the problem underlying the invention would not be solved. Therefore, even combining D9 or D10 with D2 and D4 or D11 would not bring the skilled person closer to the invention defined in claim 1 unless inventive skill were used.

2.15 Documents D5 and D6 were also cited by the appellant for combination with D2, and where necessary with D9 or D10. However D5 and D6 also relate to coiler systems for reversing mills as D4 and D11. Thus the same arguments as apply to the possible combination of D4 or D11 with D2 also apply to the possible combination of D5 or D6 with D2. Moreover, as mentioned in the Board's communication subsequent to the oral proceedings summons, neither D5 nor D6 apparently unambiguously

discloses a drive unit in accordance with feature 1(f) and thus these documents are less relevant than D4.

2.16 The subject matter of claim 1 thus involves an inventive step in light of the cited prior art, and the requirement of Article 56 EPC 1973 is consequently fulfilled.

3. *Auxiliary requests*

Since none of the objections made by the appellant gives rise to alteration of the decision of the opposition division, the appeal is to be dismissed. Since the main request of the respondent is thereby met, the auxiliary requests need not be considered.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

M. Patin

P. Alting van Geusau