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Datasheet for the decision of 4 July 2013

Case Number: T 0580/11 - 3.2.08

Application Number: 99931572.4

Publication Number: 1026278

IPC: C22C 38/06, C21D 9/46

Language of the proceedings: EN

Title of invention:
Use of a ferritic steel sheet having excellent shape fixability and manufacturing method thereof

Patent Proprietor:
Nippon Steel & Sumitomo Metal Corporation

Opponent:
ThyssenKrupp Steel Europe AG

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56
RPBA Art. 12(1)(4), 13(1)(3)

Keyword:
"Late-filed documents (admitted in part)"
"Late-filed requests (admitted in part)"
"Novelty and inventive step (yes, after amendments)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0580/11 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 4 July 2013

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 3 January 2011 concerning maintenance of the European patent No. 1026278 in amended form.

Composition of the Board:

Chairman: T. Kriner
Members: R. Ries
D. T. Keeling

Summary of Facts and Submissions

I. By its interlocutory decision dispatched on 3 January 2011, the opposition division held that the subject matter of the claims according to the main request then on file met the requirements of the EPC and that the patent could be maintained in amended form on the basis of this request.

II. The appellant (opponent) lodged an appeal against this decision on 10 March 2011, paying the appeal fee on 8 March 2011. The statement setting out the grounds of appeal was filed on 12 May 2011.

III. On appeal, the parties essentially referred to the following documents:

D2: O. Hashimoto et al.: "Development of {111} Texture in Intercritical Annealing of Low Carbon Steels", Transactions ISIJ, Volume 27, 1987, pages 746 to 754;

D6c: JP-A-06-17139 translation into English;

D10a: EP-A-0 903 419 (& D10: WO-A-98/28457);

D11: DE-A-2 316 324;

D12: DE-A-2 133 744;

D13: DE-A-31 14 020.

IV. Oral proceedings took place before the Board on 4 July 2013. The following requests were made:

– The appellant requested that the decision under appeal be set aside and the European patent No. 1 026 278 be revoked.

– The respondent (patent proprietor) requested that the appeal be dismissed (main request) or, alternatively,
that the decision under appeal be set aside and the patent be maintained in accordance with one of auxiliary requests 1 to 3, all filed with letter of 3 June 2013, or
in accordance with one of auxiliary requests 4 to 6, all filed during the oral proceedings on 4 July 2013.

V. Independent claims 1, 5 and 6 of the main request read as follows:

"1. Use of a ferritic cold-rolled steel sheet having an excellent shape fixability for making automobile parts, the ferritic cold-rolled steel sheet having a ratio of presence of {100} planes parallel with a sheet surface to {111} planes of not less than 1.0."

"5. A method of producing a ferritic cold-rolled steel sheet having an excellent shape fixability according to one of claims 1 to 3, comprising the steps of:
conducting hot-rolling on a slab of a predetermined composition so that a total rolling reduction is 25% or more in the hot rolling conducted at a temperature range from a temperature not higher than 950°C to a

temperature not lower than the transformation temperature Ar_3 and a coefficient of friction is 0.2 or less in the hot rolling conducted at a temperature not higher than 950°C;
completing the hot rolling at a temperature not lower than transformation temperature Ar_3;
cooling the hot-rolled steel strip;
coiling the hot-rolled steel strip at a temperature not higher than a critical temperature T_0 determined by the following expression;
pickling the hot-rolled steel strip;
conducting cold-rolling on the steel strip at a rolling reduction lower than 80%;
heating the cold-rolled steel strip in a temperature range from a temperature not lower than 600°C to a temperature lower than transformation temperature Ac_3;
and cooling the steel strip:

$$T_0 = -650.4 \times C\% - 50.6 \times Mn_{eq} + 894.3$$

where

$$Mn_{eq} = Mn\% + 0.5 \times Ni\% - 1.49 \times Si\% - 1.05 \times Mo\% - 0.44 \times W\% + 0.37 \times Cr\% + 0.67 \times Cu\% - 23 \times P\% + 13 \times Al\%.$$

"6. A method of producing a ferritic cold-rolled steel sheet having an excellent shape fixability according to one of claims 1 to 3, comprising the steps of:
conducting hot-rolling on a slab of a predetermined composition so that a total rolling reduction is 25% or more in the hot rolling conducted at a temperature not higher than the transformation temperature Ar_3; and a coefficient of friction is 0.2 or less in the hot rolling conducted at a temperature not higher than the Ar_3;

cooling the hot-rolled steel strip; and
coiling the hot-rolled steel strip;
pickling the hot-rolled steel strip;
conducting cold-rolling on the steel strip at a rolling reduction lower than 80%;
heating the cold-rolled steel strip in a temperature range from a temperature not lower than 600°C to a temperature lower than transformation temperature Ac_3; and cooling the strip."

According to **auxiliary request 1** the term "lower than 80%" in claim 6 of the main request has been replaced by "not higher than 70%".

In **auxiliary request 2** the term "lower than 80%" featuring in claims 5 and 6 of the main request has been replaced by "not higher than 70%".

Auxiliary request 3 differs from auxiliary requests 1 or 2 in that claim 5 has been deleted.

In **auxiliary request 4,** claim 6 has been deleted from the claims of auxiliary request 2.

Auxiliary request 5 complies with auxiliary request 4 except for claim 5, wherein the wording "comprising" has been replaced by "consisting of".

Auxiliary request 6 is restricted to claims 1 to 4 of the main request.

VI. The arguments of the appellant relevant to the present decision can be summarized as follows:

Admission of documents D10a to D13 into the appeal proceedings

Documents D10a to D13 were filed after the expiry of the opposition period because the appellant became aware of these documents by accident at an advanced stage of the proceedings. The newly found documents were enclosed with the statement of the grounds of appeal, they were easily comprehensible and did not result in delaying the proceedings.

In particular D10a and D13 disclosed all the method steps set out in claims 5 and 6. Therefore, they were novelty-destroying and prima facie highly relevant. Hence documents D10a to D13 should be admitted into the appeal proceedings.

Procedural matter

The amended sets of claims according to auxiliary requests 4 to 6 submitted during the oral proceedings were filed at a very late stage of the appeal proceedings. It was not immediately evident whether the amendments to the claims had a basis in the application as originally filed and, therefore, auxiliary requests 4 to 6 should be disregarded.

Novelty

Document D10a disclosed a process for producing ferritic steel sheet comprising inter alia the steps of:

rough hot rolling (HR) at 950°C to A_{r3},
finishing hot rolling (FHR) at A_{r3} or below with a coefficient of friction (COF) of 0.2 or preferably 0.15 or less,
cold rolling (CR) the steel sheet within a range of 50 to 95% reduction rate (RR),
pickling and annealing the CR steel sheet (D10a, paragraphs [0040] to [0047]; claim 9). Given that the same starting material was used and the same process steps were performed as claimed in method claims 5 and 6 of the main request or auxiliary request 1 to 3, or claim 5 of auxiliary requests 4 and 5, respectively, the same microstructure in the final product was expected to be achieved in the known ferritic steel sheet.

As to claim 1 of all requests, document D10a further disclosed the use of the known ferritic steel sheet for producing rectangular parts such as automotive oil pans (D10a, paragraph [0001]). The same arguments apply for the ferritic steel sheet which was produced according to the process described in document D6c even if a specific texture was not mentioned.

The subject matter of claims 1, 5 and 6 of the main request and auxiliary requests 1 to 5 and of claim 1 of auxiliary request 6 therefore lacked novelty over D10a or D6c, respectively.

Inventive step

Figure 2 of document D2 disclosed a ferritic steel sheet (sample NB) which after annealing at 700°C exhibited a (200)/(222) microstructure with a texture

ratio of these planes of about 1 or more. Consequently, a ferritic steel sheet having the claimed ratio of {100}:{111} planes of not less than 1.0 was known in the art. Since the excellent deep drawability of this steel sheet was known in the art, it was obvious for the skilled person to use the known steel for producing automotive parts.

The subject matter of claim 1 of all requests therefore did not involve an inventive step.

VII. The arguments of the respondent relevant to the present decision can be summarized as follows:

Admission of documents D10a to D13

Documents D10a to D13 could have been submitted already during the opposition proceedings rather than on appeal and, therefore, they were late-filed. The appellant did not present a convincing explanation or reason as to why D10a to D13 were submitted for the first time on appeal. The documents anticipated neither the steps of the claimed method set out in claims 5 and 6 nor the use according to claim 1 of the main request or auxiliary requests 1 to 6, respectively. Since D10a to D13 were prima facie not highly relevant to the subject matter claimed in the patent, they should not be admitted into the proceedings.

Procedural matter

The set of claims according to auxiliary requests 4 to 6 comprised only limitations by deleting specific claims (auxiliary requests 4 to 6) or the introduction

of a more restrictive wording as in claim 5 of auxiliary request 5. All amendments were easy to understand and did not delay the proceedings. Therefore, the amended set of claims according to auxiliary requests 4 to 6 should be admitted into the proceedings.

Novelty

The process claimed in the patent aimed at producing a ferritic steel sheet exhibiting a high bending formability and shape fixability so that the quantity of spring-back after forming was suppressed or even avoided. These properties were achieved by a particular texture which favoured the {100} planes and which was defined in claim 1 by the ratio {100}:{111} ≥ 1. Due to their reference back to claim 1, also process claims 5 and 6 included the texture ratio as an important feature which could not be disregarded when comparing the claimed process with the prior art. It was therefore clear that the method set out in claims 5 and 6 of the patent must be performed in such a manner that the texture ratio {100}:{111} ≥ 1 was actually achieved.

By contrast, document D10a referred to a process for producing ferritic steel sheet favouring the formation of the {111} texture. The steel sheet in D10a had only a very small ratio of {100} planes to {111} planes, i.e. the {100}:{111} ratio was far lower than 1.0. The method disclosed in D10a required annealing of the hot rolled steel sheet before CR in order to develop the preferred {111} texture, as mentioned in paragraphs [0062] and [0063] and Tables 2 and 3 of D10a. Contrary thereto, the step of annealing the hot rolled steel

sheet before CR was not performed according to the method set out in claims 5 and 6. Moreover, the lubrication was done in D10a only in the FHR step which was carried out always below Ar_3 (see D10a, examples in Tables 2 and 3). In contrast thereto, the claimed method required HR with a COF of less than 0.2 in the complete HR process. Therefore the process described in D10a did not result in the desired texture and thus not in improving the shape fixability.

Inventive step

Starting from the technical disclosure of D10a and aiming at improving the shape-fixability of the ferritic steel sheet, the skilled person had no reason to consult D2 or any other document which did not mention this object at all, and even if he did, none of these documents would prompt him to perform a process which resulted in a steel sheet having a {100}:{111} $\geq$ 1 texture.

The claimed subject matter of all requests therefore involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. Admission of D10a to D13

Documents D10a to D13 were all filed for the first time in the appeal proceedings. Accordingly, they are late-filed and it lies in the Board's discretion to admit

them into the proceedings or not. Reference is made in this context to Article 12(4) of the Rule of Procedure of the Boards of Appeal (RPBA), according to which everything presented by the parties under Article 12(1) RPBA shall be taken into account by the Board if and to the extent it relates to the case under appeal and meets the requirements of Article 12(2) RPBA.

As pointed out in the Board's communication annexed to the summon to oral proceedings, the technical disclosure of documents D10a and D13 was considered as being highly relevant at least to the process set out in claim 6 of the main request. In particular D10a seemed to describe all the process steps of claim 6. D13, the only document which addressed the object of producing steel sheet having a high shape fixability (Formtreue), was regarded as being relevant prior art when assessing whether the process set out in claims 5 and 6 of the main request involved an inventive step. During the oral proceedings, the Board had no reason to doubt its earlier findings and, therefore, documents D10a and D13 were admitted into the appeal proceedings.

Documents D11 and D12 are considered as being less relevant, since in D11 the process parameters are described in very general terms and there is no teaching about lubricating the rolls during HR in D11 and D12, the latter being concerned exclusively with the use of a hot-rolled steel sheet. Therefore, D11 and D12 were not admitted into the proceedings.

3. Novelty

3.1 Like the method set out in claim 6 of the main request and auxiliary requests 1 to 3, document D10a discloses a method of manufacturing a cold-rolled thin ferritic steel sheet. The process of D10a comprises the steps of:
conducting rough HR above A_{r3} with a total reduction rate (RR) of 50% or more on a steel slab having a predetermined composition;
conducting FHR at the transformation point A_{r3} to 600°C with a RR of 70% or more under lubrication with a COF of 0.15 or less;
cooling the HR steel strip
coiling the HR steel strip;
(annealing the HR steel strip;)
pickling the HR steel strip;
CR the steel strip with a RR in the range of 50 to 95%;
(finishing) annealing the HR strip between 600 to 950°C;
and cooling the strip (D10a, paragraphs [0040] to [0047]; claim 9; Table 2).

Consequently, no technical difference exists between the process steps of claim 6 and those disclosed in document D10a.

3.2 The appellant argued that D10a aimed at promoting a {111} texture rather than a {100}:{111} ≥ 1 texture as mentioned in claim 1 of the patent and also in claim 6 referring back to claim 1. Therefore, the method of D10a led to a different product (D10a, [0040], [0042]; [0044]; [0058]; [0059]). It further argued that the method of D10a required after FHR and coiling but before CR an annealing step to develop the {111} texture (D10a, [0058], Table 2). Such an annealing step

was not mentioned in claim 6 of the patent. Moreover, the method according to claim 6 of the patent had to be put into practice by the skilled person such that the {100}:{111} ≥ 1 texture was obtained.

3.3 The Board does not agree. Firstly, when using the same steel composition (which is unspecified in method claim 6, but described in use claim 3) as a starting material and performing the same process steps on it, the same result (i.e. the same microstructure or texture in the steel sheet) is to be expected. If the result obtained by the claimed process was actually different to that described in the prior art, then the claimed process is supposed not to disclose all the essential and distinguishing steps by which the different product is brought about.

Secondly, it is not correct - as considered by the appellant - that performing the same process on the same material but with a different purpose or object would render the claimed process novel over the prior art which does not mention that purpose or refers to an object different to that aimed at by a patent. The feature of "performing the process such that a specific texture is obtained" would mean defining the process in terms of the result to be achieved rather than by the process steps which are indispensable and necessary to obtain the desired texture.

Thirdly, the claimed process actually does not exclude thermally treating the hot-rolled steel after FHR and before CR, as argued by the appellant. Specifically, claim 6 of auxiliary requests 1 to 3 even includes the step of recovering and recrystallising the HR steel

sheet before CR. Hence no difference is seen in that respect between the process of claim 6 and that described in document D10a.

Consequently, the process set out in claim 6 of main request lacks novelty over D10a.

4. Auxiliary requests 1 to 3

4.1 In claim 6 of auxiliary requests 1 to 3, the RR of the CR step has been limited to not higher than 70%. The appellant argued that in the examples given in Table 2 of D10a, the CR-RR was 76 and 85% which thus fell outside the claimed range. In the appellant's view, the claimed process was therefore novel over D10a.

4.2 The Board disagrees. Paragraph [0046] of D10a discloses that the RR should be in the range of 50% and 95% during CR. The lower limit of 50% is within the claimed range and already for this reason, the claimed range in claim 6 was anticipated by the disclosure of D10a.

As can be further seen, an overlap (50-70%) exists between the claimed range for the RR during CR and the known process. It therefore has to be examined whether the claimed range could be regarded as a selection from the known range. Such a selection is, however, only novel over the prior art, if
(i) the selected range is narrow in relation to the prior art;
(ii) the examples according to the prior art are sufficiently far remote from the selected range claimed in the patent specification and

(iii) there is a novel effect not disclosed in the prior art.
All of the three conditions must be fulfilled.

It is evident from the examples given in Table 2 of document D10a, that CR is performed at a RR of 76, 80 and 85%. At least the value of 76% RR is not far remote from the upper limit of 70% claimed in the patent. Hence, condition (ii) is not met.

Consequently, claim 6 of auxiliary requests 1 to 3 is not allowable for lack of novelty of its subject matter.

5. Admission of auxiliary requests 4 to 6 into the proceedings

5.1 The appellant objected to introducing auxiliary requests 4 to 6 into the proceedings since they were late-filed.

5.2 At the oral proceedings, it has not been prima facie discernible whether the amendments to claim 5 of auxiliary request 5 were adequately supported by the application as filed and whether the process set out in claim 5 of auxiliary requests 4 and 5 was actually novel and inventive over the cited prior art. Under these circumstances and having regard to Article 13(1), (3) of the RPBA, auxiliary requests 4 and 5 were not admitted into the appeal proceedings.

In auxiliary request 6 the claims have been limited to the use of a cold-rolled ferritic steel sheet according to claims 1 to 4. This amendment is very simple and

cannot take the appellant by surprise. Therefore, auxiliary request 6 was admitted into the proceedings.

6. Auxiliary request 6

6.1 Novelty

The appellant argued that the subject matter of claim 1 lacked novelty over D10a or D6c, respectively, since both documents disclosed the same process and the use of the final ferritic steel sheet for producing automotive parts. The appellant further referred to document Figure 2 of D2 which disclosed a ferritic steel sheet having a texture with a ratio of planes {100}:{111} of about 1 or more. Using such a ferritic steel sheet for manufacturing automotive parts was obvious for the skilled person. In the appellant's view the subject matter of claim 1 of auxiliary request 6 therefore lacked an inventive step with respect to document D2.

The Board does not agree. Neither D10a nor D6 specifically mention a ferritic steel sheet having a {100}:{111} ≥ 1 texture. As previously mentioned, the {111} texture is preferably developed by the process of D10a. Document D6c is completely silent on the specific texture in the final steel sheet.

It may be true that Figure 2 of D2 encompasses a steel sheet having a {100}:{111} ≥ 1 texture, but this document does not disclose the use of such a steel sheet for producing automotive parts.

Consequently, the subject matter of claim 1 of auxiliary request 6 is novel.

6.2 Inventive step

Claim 1 of auxiliary request 6 is concerned with the use of ferritic steel sheet for producing automotive parts whereby the steel sheet exhibits an improved bending formability and high shape fixability and the quantity of spring-back is suppressed. This object is achieved when the ratio of the {100} plane, which is parallel with the sheet face, to the {111} plane is not less than 1 in the texture of the steel sheet used according to claim 1 (the patent specification, [0008]; [0009]).

The processes disclosed in either document D2 or D10a aim at developing a {111} texture by intercritical annealing which is contrary to the texture aimed at by the patent (D2, page 746, column 2, second full paragraph; page 753, point V.: Conclusion; D10a, paragraphs [0040] and [0058]). Hence, these documents are teaching away from using a ferritic steel sheet having a {100}:{111} ≥ 1 texture, as required by claim 1.

Although D6c discloses the use of cold-rolled ferritic sheet for automotive exterior parts, it does not address the objet of improving the shape fixability and fails to mention any particular texture at all which could be considered favourable in that respect.

Document D13 is actually concerned with producing automotive parts from a ferritic steel sheet having a

high shape-fixability (Formtreue) and a high Lankford-value (r-value) (D13, page 3, second paragraph). However, no incentive is given anywhere in this document which would prompt the skilled person to choose a {100}:{111} ≥ 1 texture in the final product so as to improve the bending formability and shape fixability.

Consequently, the subject matter of claim 1 of auxiliary request 6 involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the following documents:

   Claims: 1 to 4 according to auxiliary request 6 filed at the oral proceedings;

   Description: pages 2 to 21 filed at the oral proceedings;

   Drawings: Figures 1 to 3 of the patent as granted.

The Registrar: The Chairman:

V. Commare T. Kriner