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**Datasheet for the decision
of 20 March 2013**

Case Number: T 1304/09 - 3.2.07

Application Number: 03013731.9

Publication Number: 1380666

IPC: C23C 2/12, C23C 2/28,
B32B 15/01

Language of the proceedings: EN

Title of invention:
Aluminium-coated structural member and production method

Patentee:
NISSAN MOTOR CO., LTD.

Opponent:
ARCELOR France

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no, all requests"

Decisions cited:
-

Catchword:
-



Case Number: T 1304/09 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 20 March 2013

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted 8 April 2009
revoking European patent No. 1380666 pursuant
to Article 101(3) (b) EPC.**

Composition of the Board:

Chairman: H. Meinders
Members: G. Patton
E. Kossonakou

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the decision of the Opposition Division to revoke European patent No. 1 380 666.

The opposition had been filed against the patent as a whole and was based on Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100(b) EPC (insufficiency of disclosure).

The Opposition Division held that the ground of lack of novelty held against the patent having regard to the following documents:

- D1 Vaissiere, L. et al., "Development of Pre-Coated Boron Steel for Applications on PSA Peugeot Citroën and RENAULT Bodies in White", International Body Engineering Conference 2002, 9-11 July 2002, SAE international, Paper Number 2002-01-2048, Paris, France
- D2 US-A-2002/0069506
- D3 EP-A-0 971 044
- D4 EP-A-1 013 785

II. With the statement of grounds of appeal the appellant defined the set of claims of the patent as granted to be its main request and the set of claims subject to the appealed decision as its auxiliary request.

The respondent (opponent) replied to the statement of grounds of appeal and raised objections based on lack of novelty and sufficiency of disclosure. It also cited

for the first time the following document of relevance for the present decision:

D7 Béranger, G. et al., "Le livre de l'Acier", Technique & Documentation - Lavoisier, Paris, 1994, p. 653-656

The appellant then filed further arguments and contested for the first time in the appeal proceedings the public availability of D1 prior to the priority date of the contested patent.

The Board provided the parties with its preliminary non-binding opinion annexed to the summons for oral proceedings; the publication date of D1 should be clarified and the subject-matter of independent method claim 10 of the main request could be regarded as being novel with respect to the cited prior art.

In reaction, the respondent filed the following evidence:

D1' Letter of Mrs P. Kreh, SAE International, to Mr D. Kaplan, ArcelorMittal France, dated 4 January 2013, 1 page

to support the prior public availability of D1, together with additional arguments against the novelty and the inventive step of the claimed subject-matter.

The appellant also reacted to the Board's preliminary opinion by filing an amended description for the auxiliary request.

Oral proceedings took place on 20 March 2013 at the end of which the present decision was announced.

The appellant explicitly withdrew its request to remit the case to the department of first instance.

III. The appellant requested that the decision under appeal be set aside and the European patent maintained in accordance with either the main request (patent as granted) or auxiliary request 1 (patent with the set of claims dated 21 November 2007 and discussed in the impugned decision), both requests filed with the statement setting out the grounds of appeal dated 17 August 2009.

IV. The respondent requested that the appeal be dismissed.

V. Claim 1 of the main request (patent as granted) reads as follows:

"An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel substrate layer, the alloy layer including a softer region having a hardness smaller than or equal to a hardness of the steel substrate layer, extending from the surface of the steel substrate layer toward a surface of the alloy layer, and having a thickness greater than or equal to 50% of a thickness of the alloy layer, the Al-Si-Fe alloy layer having an oxide weight smaller than or equal to 500 mg/dm²."

Claim 9 of the main request reads as follows:

"An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel substrate layer, the Al-Si-Fe alloy layer having a multi-layer structure including an inner layer contiguous with the steel substrate layer, an outer layer forming a surface of the alloy layer and an intermediate layer formed between the inner and outer layers, the inner layer containing 85~95% Fe, the intermediate layer containing 25~40% Al, and the outer layer being harder than the steel substrate layer."

Claim 10 of the main request reads as follows:

"A production method of an aluminum-coated structural member including an Al-Si-Fe alloy coating layer, comprising:
heating a hot-dip aluminum-coated steel sheet at a heating rate in a range of 1~10°C/sec;
holding the hot-dip aluminum steel sheet at a raised temperature in a temperature range of 900~950°C for a duration in a range of 2~8 minutes;
cooling the hot-dip aluminum-coated steel sheet to a temperature in a temperature range of 700~800°C at a cooling rate in a range of 5~15°C/sec;
forming the hot-dip aluminum-coated steel sheet into a predetermined shape in the temperature range of 700~800°C; and
cooling the hot-dip aluminum-coated steel sheet in the predetermined shape rapidly from the temperature range of 700~800°C to a lower temperature lower than or equal to 300°C at a cooling rate in a range of 20~100°C/sec."

Claim 1 of auxiliary request 1 reads as follows (in bold the amendments with respect to claim 1 of the main request; emphasis added by the Board):

"An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel substrate layer, the alloy layer including a softer region having a hardness smaller than or equal to a hardness of the steel substrate layer, extending from the surface of the steel substrate layer toward a surface of the alloy layer, and having a thickness greater than or equal to 50% of a thickness of the alloy layer, the Al-Si-Fe alloy layer having an oxide weight smaller than or equal to 500 mg/dm²;
wherein the Al-Si-Fe alloy layer has a multi-layer structure including an inner layer contiguous with the steel substrate layer, and an outer layer forming the surface of the alloy layer;
wherein the inner layer is a softest layer in the multi-layer structure."

Claim 7 of the auxiliary request reads the same as claim 9 of the main request and the method claim has been deleted.

VI. The appellant argued essentially as follows:

D1 should not be considered as belonging to the prior art since its publication date is uncertain, despite the declaration D1'. Similarly, it remains unclear what of its technical content was actually disclosed during the oral presentation which lasted only 20 minutes and

was held one day before the priority date of the contested patent.

Main request

None of the cited prior art documents discloses at least the heating rate of 1~10°C/s for the austenitisation step so that the subject-matter of method claim 10 is novel.

This feature, which is the only distinguishing feature of claim 10 over the closest prior art D1, leads to the technical problem of avoiding local melting of the aluminium alloy coating thanks to the Fe diffusion in said coating. The skilled person faced with this problem knows that many other parameters influence the diffusion rate of Fe and, hence, would not necessarily think of modifying the heating rate so that inventive step is to be acknowledged for the subject-matter of claim 10.

Auxiliary request 1

None of the cited prior art documents discloses explicitly the microstructural features of the product of claim 1. Furthermore, the high heating rate applied in the process of D1 for the austenitisation step will provoke local melting of the aluminium alloy coating and alter its microstructure. Consequently, it cannot be concluded that the claimed microstructural features will be inherent in the product obtained by the process of D1. Since there is no direct and unambiguous disclosure of the claimed microstructural features in

D1, nor in any of the cited prior art documents, novelty of the subject-matter of claim 1 is given.

The products of claim 1 should be seen as a selection from the broad range of products obtained by the method of claim 10 of the main request due to the numerous process parameters mentioned therein. Performing the method over all its possible variations (ranges in temperatures, duration and heating/cooling rates) does not automatically lead to the product of claim 1 of auxiliary request 1. Therefore, the claimed product and process are not logically connected and, hence, inventive step is to be acknowledged for the claimed product even if the method is found to be not inventive.

VII. The respondent argued essentially as follows:

D1 was unambiguously published at the conference in question on 9 July 2002, two days before the priority date, as confirmed in D1' by a manager of SAE International, the organizer of the conference. Therefore, D1 belongs to the prior art for the purposes of Article 54(2) EPC.

Main request

The subject-matter of claim 10 is not novel over D1. Even the heating rate of 1~10°C/s for the austenitisation step is anticipated by D1 since this is not a novel selection from the heating range indicated for the process of D1.

Starting from D1 as the closest prior art for method claim 10 and even considering the heating rate of

1~10°C/s for the austenitisation step as the only distinguishing feature, the objective technical problem is to provide a process for manufacturing an aluminium-coated structural member including an Al-Fe-Si coating layer suitable for automotive applications in which local melting of the aluminium alloy coating is avoided. The skilled person, being aware that too high a heating rate does not leave enough time for Fe to diffuse into the coating layer and increase its local melting temperature, would clearly consider reducing the heating rate of D1. He would immediately think of applying the value of 1~10°C/s when determining the austenitisation parameters in D1. By doing so, he would arrive at the subject-matter of claim 10 in an obvious manner.

Auxiliary request 1

If at all, the only distinguishing feature of the method claim 10 of the main request over D1, namely the heating rate of 1~10°C/s of the austenitisation step, does not influence the microstructure of the resulting products. As a consequence, despite this possible difference in heating rate, the microstructural features claimed in claim 1 of auxiliary request 1 are inherent in the products obtained by the process of D1 and, hence, the claimed product is not novel over D1.

The subject-matter of claim 1 of auxiliary request 1 lacks an inventive step due to the fact that the claimed product is obtained by the non inventive method of claim 10 of the main request. By performing this non inventive method, products exhibiting the claimed microstructural features are inevitably obtained.

The appellant has not provided any proof for its allegations, in particular has not established which specific measures have to be performed to arrive at the alleged selection from the whole range of products obtained by the method of claim 10 of the main request. In addition, it is not clear from the contested patent in which way, i.e. for which microstructural features, and to which extent the products of claim 1 are selected.

Reasons for the Decision

1. Public availability of D1

- 1.1 The appellant challenges the public availability of D1 before the priority date of the contested patent. According to the program of the conference, the oral presentation of D1 was on 10 July 2002, i.e. only one day before the priority date of the contested patent of 11 July 2002.

For the appellant, the papers of such presentations are not necessarily available to the public before or at the actual presentations so that the publication date of D1 is not proven. D1 might as a consequence have been made public later than the actual presentation, e.g. in a book compiling all papers in the form of "proceedings" as it often happens for conferences. As a result, it is doubtful that D1 was made available to the public in this form before the priority date of the contested patent. Its contents clearly could not have been disclosed orally in a presentation which lasted only 20 minutes.

Regarding D1', the appellant questions the position of Mrs Kreh, the author of the letter, in the Society of Automotive Engineers International (SAE International), and whether she was present at the conference and actual witness of the facts she brings forward. D1' is not drafted as an affidavit and, hence, should be disregarded.

1.2 Contrary to the appellant's view, the Board does not see any reason to doubt the content of D1'. The letter is signed by a manager of SAE International, the organizer of the International Body Engineering Conference 2002, 9-11 July 2002, Paris, France. In D1' there is an unambiguous reference to the publication of D1 at said conference, more specifically on 9 July 2002. The facts presented in D1' are clear and unambiguous. A statement of facts need not be in the form of a sworn statement or affidavit for it to be credible nor is it necessary to that end that the author be heard as witness as long as there is no counter-evidence contradicting its content or undermining the author's credibility. The latter not being the case, the Board concludes that the publication date of D1 is 9 July 2002.

1.3 The appellant puts forward that the article filed by the respondent is not part of a booklet nor shows any page numbering so that the origin of the said document is not clear; it might not be the article that was actually published.

The Board notes that the reference number 2002-01-2048 appears both on the first page of D1 and in the program

of the conference. On D1 there is an explicit mention of copyright for SAE, Inc. The absence of page numbers speaks for the position of the respondent, namely that the article was (meant to be) distributed at the conference itself. As it is, it does not appear to be a copy out of a volume of conference "proceedings". Whether it was actually later published in such proceedings, in this form or another form, is then irrelevant. For the Board, there is no reason to doubt that D1 was meant to be distributed to the public, as such.

- 1.4 It is quite clear that the actual complete content of D1 cannot have been brought forward orally during a 20 minute talk. However, that is not the disclosure presently at stake. At issue is the publication via distribution of D1 on 9 July 2002, at the conference in question.

2. *Main request*

Method claim 10 - Novelty (Article 54(1) EPC)

2.1 Vis-à-vis D1

- 2.1.1 D1 discloses a production method of an aluminium-coated structural member including an Al-Si-Fe alloy coating layer, comprising (paragraphs 2-1, 3-2, 4-1-3 and 4-1-4; pages 6 and 7, "1) The furnace", "2) The blank transfer" and "3) The press and tool"; figure 18):
- i) heating a hot-dip aluminium-coated steel sheet;
 - ii) holding the hot-dip aluminium steel sheet at the recommended austenitisation parameters of 900°C for 4 minutes or 950°C for 3 minutes, i.e. within

the claimed temperature range of 900~950°C and duration range of 2~8 minutes;

- iii) cooling the hot-dip aluminium-coated steel sheet to a temperature of not below 780°C, i.e. within the temperature range of 700~800°C, by transfer of the blank from the furnace to the forming device without force cooling, i.e. at a cooling rate within the claimed range of 5~15°C/sec as it can be derived from the contested patent itself, [0027];
- iv) forming the hot-dip aluminium-coated steel sheet into a predetermined shape at the temperature of the transferred blank of not below 780°C, i.e. within the claimed temperature range of 700~800°C; and
- v) cooling the hot-dip aluminium-coated steel sheet in the predetermined shape from the temperature of not below 780°C, i.e. within the claimed range of 700~800°C, to 80°C, i.e. lower than the claimed upper limit of 300°C, for 15 seconds leading to a computed cooling rate of around 47°C/sec (calculated from $(780^{\circ}\text{C} - 80^{\circ}\text{C})/15 \text{ s}$), i.e. within the claimed range of 20~100°C/s, in order to avoid bainitic and ferritic areas and obtain a martensitic microstructure (last paragraph of page 6 and first paragraph of page 7). A cooling rate of more than 27°C/s is explicitly disclosed in figure 8 for obtaining a martensitic microstructure.

2.1.2 With respect to an AlFeSi alloy for the coating layer and a minimum Si content for forming a softer region, D1 explicitly discloses an alloyed layer Fe/Al/Si (figure 4; paragraph 3-2; page 7, right-hand column,

1st paragraph). Furthermore, document D7, page 653, last paragraph of "5.1. Introduction", which can be regarded as a standard text book, discloses, like in the contested patent, [0013], that there exist only two types of aluminium coatings: a pure one Alupur (type II) or AlSi (type I), the latter having around 10% Si.

Therefore, the Board considers that the "AlSi pre coated boron steel" mentioned in D1, page 7, right-hand column, is the type I of D7 and in accordance with the contested patent, [0013]. In addition, it is emphasized that there is no limit given for the Si-content in the independent claims and, hence, any type of AlSi aluminium alloys is encompassed.

2.1.3 With respect to the heating rate of the austenitisation step, **two** heating rates are mentioned in D1: 5°C/s (paragraph 4-1-2) and 15°C/s (paragraph 4-1-4), which is contrary to what is stated in the impugned decision, page 4, second complete paragraph.

Therefore, the Board is of the opinion that the claimed parameters for austenitisation are not directly and unambiguously disclosed in D1 in their claimed combination. Indeed, D1 discloses two heating rates and temperatures:

- a)- 5°C/s at 850°C (too low) for 5 min (paragraph 4-1-2); or
- b)- 15°C/s (too fast) at 900°C for 5 min (paragraph 4-1-4).

with the recommendation of maintaining the product at 900°C/4 min or 950°C/3 min (paragraph 4-1-3).

2.1.4 The first combination a) is for establishing the minimum requirements for completing austenitisation. As a consequence, even if one would consider that the heating temperature of 900°C given at the end of paragraph 4-1-2 would be disclosed in combination with the value of 5°C/s given at the beginning of the very same paragraph, which is doubtful in the Board's view, the derived combination of the parameters 5°C/s at 900°C for 5 min would still not be considered disclosed in combination with the other process features (features iii) to v)), contrary to the respondent's allegation.

The second combination b) corresponds in fact to the actual recommendations of D1 and the one actually performed (see also the heating temperature 880-950°C for 5-10 min of figure 18 and the reference to the CCT diagram on page 6, last paragraph).

2.1.5 Therefore, in view of the above, the subject-matter of claim 10 distinguishes itself over the method disclosed in D1 by the heating rate of 1~10°C/s. In D1 the heating rate applied is 15°C/s.

During the oral proceedings the appellant explicitly acknowledged that he shares the above mentioned Board's analysis of D1.

2.1.6 The respondent considers that the claimed range of 1~10°C/s is not a novel selection from the range known from D1 and, hence, cannot be regarded as a distinguishing feature, also for this reason.

For the respondent there is necessarily a range used in the method of D1 for the heating rate, said range being exemplified by at least the disclosed value of 15°C/s. Since this disclosed value is close to the upper limit of the claimed range of 10°C/s, the selected range cannot be regarded as novel.

Furthermore, even though there are no actual limits of a range disclosed in D1, there is an indication for the skilled person to work between 5 and 15°C/s. Since there is no support in the contested patent for any technical effect of the selected range of 1~10°C/s on the coating layer, it has to be regarded as an arbitrary selection from the range indication given in D1. For this reason as well, the selected range cannot be novel.

2.1.7 The respondent's view cannot be shared by the Board since there is no range disclosed in D1 for the heating rate so that the criteria to be fulfilled by a selection invention do not apply. The two values disclosed in D1 (5 and 15°C/s) do not form a range and are not disclosed in the same context (see points 2.1.3 and 2.1.4 above).

Furthermore, even if it would be accepted that there is a range implicit in D1, said range being exemplified by 15°C/s, as put forward by the respondent, its corresponding lower and upper limits are unknown so that also a possible overlap between the claimed and the implicitly "disclosed" range remains an allegation.

As a consequence, the range of 1~10°C/s is a distinguishing feature over D1.

2.2 Vis-à-vis D2

At least the following features of claim 10 are not disclosed in D2:

- the heating rate of 1~10°C/s,
- the duration of 2~8 min for the austenitisation.

The respondent uses D3, alleging it pertains to a similar steel substrate with the same aim as in D2, in order to show that the heating rate and the duration of D3 would be the same in D2.

This is, however, a mere allegation, which cannot suffice as "direct and unambiguous disclosure", required for novelty. It is true that the steels of D2 and D3 appear to be similar and the aims appear to be identical, i.e. to provide an aluminium-coated structural member exhibiting high corrosion resistance, good formability and weldability (D2, [0039], [0042], [0054]) (D3, [0014], [0021], [0028]). However, this is insufficient to consider the two disclosures as one single disclosure.

2.3 Vis-à-vis D3

2.3.1 At least the following features of claim 10 are not disclosed in D3:

- the heating rate of 1~10°C/s; and
- the cooling rate of 5~15°C/s.

2.3.2 D3, [0007], [0018], claim 6, discloses a heating rate range of higher than 5°C/s, possibly even higher than 600°C/s for a heat treatment performed after the

forming step. This high heating rate is applied in order to heal the possible cracks created in the coating layer during the forming step ([0018]-[0019]). Therefore, the lower limit of 5°C/s disclosed in D3 relates to a process in which the heat treatment is performed after forming, contrary to the contested patent where it is performed before forming, so that it cannot be seen as anticipating the claimed heating rate range.

Regarding the cooling rate range, the respondent considers that the transfer between the furnace and the forming device is done without any forced cooling so that the cooling rate corresponds to the claimed cooling rate (patent, [0027]). In addition, the transfer inevitably leads to a temperature decrease, implicitly going down to 800°C. Furthermore, since it is foreseen in D3 to obtain a martensitic microstructure, see paragraph [0023], the starting temperature for the fast cooling step cannot be lower than 700°C. As a consequence, the forming step has to be performed implicitly within the claimed temperature range.

2.3.3 This view regarding the temperature of the forming step cannot be shared by the Board since D3 is completely silent on the temperature of the forming step ([0004], [0012], [0013], "traitement thermique réalisé sur pièce finie ou lors d'un procédé de formage à chaud"). The temperature in the forming tool is not given; the above reasoning remains a mere allegation.

2.4 Vis-à-vis D4

D4 discloses an austenitisation temperature of 900°C and a forming step with quenching in the tool ([0019]). D4 is, however, silent on at least the heating rate and holding time of the austenitisation step as well as the temperature of the forming step.

2.5 In light of the above, the subject-matter of method claim 10 of the main request is novel (Article 54(1) EPC).

Method claim 10 - Inventive step (Article 56 EPC)

2.6 Both parties agree with D1 being the closest prior art for the method of claim 10. Indeed, D1 is in the same technical field of providing an aluminium-coated structural member including an Al-Fe-Si coating layer for automotive applications and, similarly to the contested patent, [0003]-[0004], also aims at improving formability, corrosion resistance and weldability (see paragraph 4-2 and pages 8-9, "Conclusion").

As discussed for novelty above, the only distinguishing feature of the method of claim 10 over D1 is the heating rate of 1~10°C/s for the austenitisation step. In D1, the heating rate is higher (15°C/s).

According to the contested patent, [0026], lines 26-28, the technical effect of the claimed upper limit for the heating rate of 10°C/s is to avoid local melting of the aluminium alloy coating.

The objective technical problem is therefore to avoid in the known process for manufacturing an aluminium-coated structural member including an Al-Fe-Si coating layer suitable for automotive applications the local melting of the aluminium alloy coating.

The skilled person is, however, aware, as put forward by the respondent, that too high a heating rate does not leave enough time for Fe to diffuse in the coating layer and increase its local melting temperature. Consequently, faced with the said problem, he would come up with a reduction of the heating rate as the solution. In this respect, the value disclosed for determining the austenitisation parameters, i.e. 5°C/s (paragraph 4-1-2), will immediately be considered a feasible heating rate since this lower value still works for austenitising the steel. By doing so, he would obviously arrive at the claimed subject-matter.

- 2.7 The fact that many other parameters influence the diffusion rate of Fe in the alloying layer, as argued by the appellant, in particular the temperature and duration of the austenitisation step, would not discourage the skilled person from modifying the heating rate to solve the above problem, especially taking into account the complete teaching of D1.

Consequently, the subject-matter of method claim 10 of the main request lacks an inventive step (Article 56 EPC).

3. *Auxiliary request 1*

Product claim 1 - Novelty (Article 54(1) EPC)

3.1 The features of claim 1 of auxiliary request 1 are as follows:

- A An aluminium-coated structural member comprising:
- B a steel substrate layer;
- C an Al-Si-Fe alloy layer formed on a surface of the steel substrate layer,
- D the alloy layer including a softer region having a hardness smaller than or equal to a hardness of the steel substrate layer,
- E the softer region extending from the surface of the steel substrate layer toward a surface of the alloy layer, and having a thickness greater than or equal to 50% of a thickness of the alloy layer,
- F the Al-Si-Fe alloy layer having an oxide weight smaller than or equal to 500 mg/dm^2 ,
- G the Al-Si-Fe alloy layer has a multi-layer structure including an inner layer contiguous with the steel substrate layer, and an outer layer forming the surface of the alloy layer,
- H the inner layer is a softest layer in the multi-layer structure.

In the impugned decision, lack of novelty has been held against claim 1 of auxiliary request 1 on the basis of D1, D2, D3 and D4. Since none of the prior art documents discloses explicitly the features of the claimed product, the impugned decision discusses whether the features of method claim 10 of the patent as granted, i.e. claim 10 of the main request, are

disclosed in the prior art documents. Finding confirmation of this, it concludes that the products inevitably resulting from these known processes must anticipate the product of claim 1, i.e. the claimed microstructural features are inherent in the products obtained by the processes known from the prior art.

The Board and the parties are of the same opinion, namely that none of the available prior art documents explicitly discloses the microstructural features D to H of claim 1 and that novelty of the claimed product should be assessed in view of the distinguishing feature(s) of method claim 10 of the main request over the known processes.

3.2 Vis-à-vis D1

3.2.1 As discussed under point 2.1.1 above, D1 explicitly discloses features A, B and C of claim 1 of auxiliary request 1.

The respondent considers that even if the only distinguishing feature of the method claim 10 of the main request over D1 (see point 2.1.5 above) is the heating rate of 1~10°C/s for the austenitisation step, this does not influence the microstructure of the products obtained. As a consequence, despite the difference in heating rates between the method disclosed in D1 and method claim 10 of the main request, the claimed microstructural features D to H are inherent in the products obtained by the process of D1 and, hence, the claimed product is not novel over D1.

The Board cannot follow the respondent's view since, as stated in the contested patent, [0026], lines 26-28, the high heating rate applied in D1 leads to local melting of the coating layer. There is no information in D1 to the contrary. Since local melting inevitably alters the final microstructure of said coating layer, there is no direct and unambiguous disclosure in D1 that the products obtained by the process of D1 would inevitably exhibit the microstructural features D to H.

Therefore, the product of claim 1 is novel over the product resulting from the method of D1 (Article 54(1) EPC).

- 3.2.2 With respect to features D-E, H (the hardness condition of the layer) the appellant cites paragraph 3-2 and figure 6 of D1 where a hardness of 600 HV_{0.1} is given for the coating. This would show that the alloyed layer of D1 is harder than the steel substrate layer, unlike required in claim 1. D1 even mentions page 3, left-hand column, bottom, that "the very hard alloyed layer is strongly adhered to the substrate", which would be in contradiction with the aim of the contested patent of a soft layer adhering to the substrate for formability purposes. Therefore, for this reason the structural member as disclosed by D1 would fall outside the scope of claim 1.

This line of argument cannot be followed by the Board since there is no hardness limit given in claim 1 which would exclude the value disclosed in D1, should the disclosed value be an average or a local one at a fine scale. Indeed, as put forward by the respondent, it is not clear where the hardness was measured in D1 and,

furthermore, the value is not incompatible with the hardness values of table 1, figure 4 of the contested patent (see for instance the hardnesses of the intermediate and outer layers of examples 1, 4, 5 according to the invention, which are 690 and 700, respectively 800 and 810).

- 3.2.3 The appellant further argues that the concern of D1 is "increasing of the layer hardness" (page 3, paragraph 3-2 and paragraph 4-1-1), which is contrary to the aim of the contested patent and the microstructural features included in claim 1.

This line of argument cannot be followed by the Board either since D1 is not concerned with increasing the hardness of the coating layer but rather with providing good formability and corrosion resistance (pages 8-9, "Conclusion") as well as weldability (page 4, paragraph 4-2). The passage of D1, page 3, paragraph 3-2 simply explains an inevitable consequence of the heat treatment, in particular iron diffusion from the steel to the coating, exactly like in the contested patent, [0019]-[0021], leading inevitably to features G and H if no local melting occurs. The Jominy curve given in paragraph 4-1 of D1 concerns the steel substrate, not the coating layer.

- 3.3 Vis-à-vis D2, D3 and D4

As discussed under points 2.2 to 2.4 above, the heating rate is also a distinguishing feature of method claim 10 of the main request over the processes disclosed in each of the documents D2, D3 and D4 so that the above support for novelty of the subject-

matter of claim 1 of auxiliary request 1 vis-à-vis D1 (see point 3.2) still holds vis-à-vis each of the documents D2, D3 and D4.

As a result, the subject-matter of claim 1 of auxiliary request 1 is novel (Article 54(1) EPC).

Product claim 1 - Inventive step (Article 56 EPC)

3.4 The Board shares the respondent's view that the subject-matter of claim 1 of auxiliary request 1 lacks an inventive step due to the fact that the claimed product is obtained by the method of claim 10 of the main request which does not involve inventive step (see points 2.6 and 2.7 above). Indeed, there are no convincing arguments from the appellant to consider that the direct result from a production method which is found to be non inventive may lead to a product which is inventive.

3.5 The appellant argues that claim 1 of auxiliary request 1 is the result of a selection among the broad range of products obtained by method claim 10 of the main request and as a result of the numerous process parameters. Performing the method in all its possible variations (ranges in temperatures, duration and heating/cooling rates) does not automatically always lead to the product of claim 1 of auxiliary request 1. Therefore, the claimed product and process are not inextricably connected and, hence, an inventive step is to be acknowledged for the claimed product, even if it is obtained from a non inventive method.

The Board cannot follow this view since the appellant has not provided any proof for its allegations, in particular has not established which specific process feature(s) lead to obtaining the selected products. In addition, it is not clear from the contested patent in what manner, i.e. which features D to H, and to which extent the products of claim 1 should be selected out of the whole range of products obtained by the method of claim 10 of the main request.

- 3.6 For exactly the same reasons, the products of claim 1 of auxiliary request 1 cannot correspond to a selection from the products obtained by the method of D1.

As discussed for inventive step on method claim 10 of the main request under point 2.6 above, the skilled person would perform without inventive skills the method of D1 with an adapted heating rate for the austenitisation step. By doing so, he will obtain products inevitably exhibiting the microstructural features D to H.

In view of the above, the subject-matter of claim 1 of auxiliary request 1 lacks an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders