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**Datasheet for the decision
of 22 March 2011**

Case Number: T 0082/08 - 3.2.07

Application Number: 00870243.3

Publication Number: 1201321

IPC: B05D 3/02

Language of the proceedings: EN

Title of invention:

Method of producing painted metal sheets

Patentee:

ARCELOR France, et al

Opponent:

ThyssenKrupp Steel Europe AG

Headword:

-

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

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Keyword:

"Inventive step: no (all requests)"

Decisions cited:

-

Catchword:

-



Case Number: T 0082/08 - 3.2.07

DECISION
of the Technical Board of Appeal 3.2.07
of 22 March 2011

Appellant:
(Opponent)

ThyssenKrupp Steel Europe AG
Kaiser-Wilhelm-Strasse 100
D-47166 Duisburg (DE)

Representative:

Simons, Johannes
COHAUSZ & FLORACK
Patent- und Rechtsanwälte
Partnerschaftsgesellschaft
Bleichstraße 14
D-40211 Düsseldorf (DE)

Respondent:
(Patent Proprietor)

ARCELOR France, et al
1 à 5, rue Luigi Cherubini
F-93200 Saint-Denis (FR)

Representative:

pronovem
Office Van Malderen
Avenue Josse Goffin 158
B-1082 Bruxelles (BE)

Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 9 November 2007
rejecting the opposition filed against European
patent No. 1201321 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: H. Meinders
Members: P. O'Reilly
E. Dufrasne

Summary of Facts and Submissions

- I. Opposition was filed against European patent No. 1 201 321 as a whole based on Article 100(a) EPC (lack of novelty and lack of inventive step).

The opposition division decided to reject the opposition.

- II. The appellant (opponent) filed an appeal against that decision.

- III. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and that the patent be maintained as amended on the basis of one of the first, second or fourth auxiliary requests, all filed with letter of 22 July 2010. The third auxiliary request was withdrawn during the oral proceedings before the Board.

- IV. Claim 1 of the **main request** (patent as granted) reads as follows:

"A method for producing a weldable organic paint layer on at least one side of a metal or metal coated substrate, for producing pre-painted metal sheets, said method comprising the steps of:

- painting a side of said substrate, resulting in a weldable organic paint layer,

- curing said paint layer by applying high energy near infra red radiation (NIR),

characterised in that during said curing step, the energy density of said Near Infra Red radiation applied on one side of said substrate is at least 400kW/m², and in that said curing takes place in a time interval less than 3 seconds."

Claim 1 of the **first auxiliary request** reads as follows (amendments when compared to claim 1 of the main request are depicted in bold by the Board):

"A method for producing a weldable organic paint layer on at least one side of a metal or metal coated substrate, for producing pre-painted **bake hardenable** metal sheets, said method comprising the steps of:

- painting a side of said substrate, resulting in a weldable organic paint layer,
- curing said paint layer by applying high energy near infra red radiation (NIR),

characterised in that during said curing step, the energy density of said Near Infra Red radiation applied on one side of said substrate is at least 400kW/m², and in that said curing takes place in a time interval less than 3 seconds."

Claim 1 of the **second auxiliary request** reads as follows (amendments when compared to claim 1 of the **main** request are depicted in bold by the Board):

"A method for producing a weldable organic paint layer on at least one side of a metal or metal coated substrate, for producing pre-painted metal sheets, said method comprising the steps of:

- painting a side of said substrate, resulting in a weldable organic paint layer,
- curing said paint layer by applying high energy near infra red radiation (NIR),

said method further comprising a pre-treatment step, resulting in a pre-treatment layer on said metal substrate, said pre-treatment step being performed before said painting step,

characterised in that during said curing step, the energy density of said Near Infra Red radiation applied on one side of said substrate is at least 400kW/m², and in that said curing takes place in a time interval less than 3 seconds."

Claim 1 of the **fourth auxiliary request** reads as follows (amendments when compared to claim 1 of the **second auxiliary request** are depicted in bold through by the Board):

"A method for producing a weldable organic paint layer on at least one side of a metal or metal coated substrate, for producing pre-painted metal sheets, said method comprising the steps of:

- painting a side of said substrate, resulting in a weldable organic paint layer,

- curing said paint layer by applying high energy near infra red radiation (NIR),

said method further comprising a pre-treatment step, resulting in a pre-treatment layer on said metal substrate, said pre-treatment step being performed before said painting step, **said pre-treatment step being a heavy metal free layer,**

characterised in that during said curing step, the energy density of said Near Infra Red radiation applied on one side of said substrate is at least 400kW/m², and in that said curing takes place in a time interval less than 3 seconds."

V. The documents of the opposition proceedings cited in the present decision are the following:

D2: CA-A-1 196 235

D3: Bericht von Herrn Dr. U. Schily über ein "NIR-Lack-Symposium" bei IndustrieSerVis GmbH, Galvanotechnik 90(1999), Nr. 5, pages 1378 - 1381.

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

(i) The subject-matter of claim 1 of the main request does not involve an inventive step.

The closest prior art document is D2. This document discloses all the features of the preamble of claim 1. In addition it discloses the feature of the characterising portion of the claim according to which the curing time takes place in a time interval of less

than three seconds. Even if this feature is not considered to be disclosed in D2 it simply constitutes a goal to be achieved. There was a desire to reduce the curing time so that this step in the production would not hold back or slow down the whole production line. The invention of D2 shortened the curing time considerably, but the desire still remained for even shorter curing times.

The problem to be solved by the characterising features of claim 1 is therefore to shorten the curing time.

D2 was published in 1985. By the priority date of the patent in suit more powerful near infrared radiation lamps had become available as indicated by D3, which on page 1378, right hand column, indicated that energy densities up to 15 MW/m² were possible. D3 also explains their usefulness in drying paint, in particular how they function (see figure 2).

When desiring to reduce the curing time for instance to less than three seconds the skilled person only needed to calculate the required energy density for the near infrared radiation lamps.

It should be noted that D2 discloses weldable paints and it is in any case a requirement in the car industry that the painted sheets should be weldable. There is no prejudice against applying near infrared radiation to curing weldable paints since D2 already does this. Also, problems that can arise using induction heating are avoided because the heating comes from the side where the paint is. The arguments of the respondent in this respect are therefore not valid.

(ii) The subject-matter of claim 1 of the first auxiliary request does not involve an inventive step.

In D2 the car industry is mentioned (see page 9, lines 4 to 5 and 17 to 21) as the field where such metal sheets are needed. It is a known requirement of the car industry that the pre-painted sheets should be bake hardenable. It is therefore self evident to the skilled person that he must ensure that this feature is not lost during curing.

(iii) The subject-matter of claim 1 of the second auxiliary request does not involve an inventive step.

It is already indicated in D2 (see page 7, lines 8 to 14) that there may be a pre-treatment. Such pre-treatments are standard in the production of such metal sheets for the car industry and D2 shows that there is no prejudice against using near infrared radiation on a pre-treated sheet.

(iv) The subject-matter of claim 1 of the fourth auxiliary request does not involve an inventive step.

It was a general progression in the car industry to avoid using heavy metal containing pre-treatments for environmental reasons. D2 already discloses such a heavy metal free pre-treatment on page 8, lines 1 to 8, where a phosphate treatment is mentioned.

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

(i) The subject-matter of claim 1 of the main request involves an inventive step.

D2 is the closest prior art document and it discloses only the features of the preamble of claim 1. Contrary to the view of the appellant it does not disclose the feature according to which the curing time takes place in a time interval less than three seconds.

The problem to be solved by the characterising features of claim 1 is to reduce the time for curing whilst maintaining the paint conductive, hence weldable.

It is true that D3 discloses near infrared radiation lamps having an energy density greater than 400 kW/m². The skilled person would not, however, have considered using such powerful lamps in the context of weldable paints. This is shown by the results of tests filed during the grant proceedings and refiled during the opposition proceedings. These show a deterioration of conductivity and hence weldability at higher power. It may be noted that D3 does not mention any use with weldable paints. This means that the skilled person would be prejudiced against using such high energy densities in the context of a weldable paint.

(ii) The subject-matter of claim 1 of the first auxiliary request involves an inventive step.

The prejudice against using high power near infrared radiation heating is increased in the case of bake hardenable sheets. The fact that in the case of bake hardenable sheets this property is not lost during curing adds a further advantage to the invention.

(iii) The subject-matter of claim 1 of the second auxiliary request involves an inventive step.

The tests of which the results were filed in the grant proceedings and refiled in the opposition proceedings were carried out on pre-treated sheets and show that the prejudice against using high energy density near infrared radiation heating is increased for sheets that have been subjected to such a treatment. The heating of the pre-treatment layer from below as shown in figure 2 of D3 would lead the skilled person to consider that the intended improvement of the interface between this layer and the paint layer would be reduced.

(iv) The subject-matter of claim 1 of the fourth auxiliary request involves an inventive step.

There has been a trend to reduce the use of heavy metals for environmental reasons. However, a heavy metal free pre-treatment presents special problems since their absence has negative effects on the conductivity and hence on the weldability of the paints. The prejudice against using high power near infrared radiation heating is thus further increased for sheets where the pre-treatment is with a heavy metal free compound.

Reasons for the Decision

Main request

1. *Inventive step*

1.1 The closest prior art document is D2. This was the view of the appellant and the respondent. The Board agrees with this view.

1.2 Also the parties, and the Board, agreed that at least the features of the preamble of claim 1 are disclosed in D2.

1.3 There was disagreement between the parties as to whether the feature of claim 1 according to which the curing takes place in less than three seconds is disclosed in D2. It is not necessary for the purposes of the present decision to decide on this point since the Board has come to the conclusion, as will be explained below, that the provision of this feature as well as the feature relating to the minimum energy density was obvious to the skilled person.

1.4 The problem to be solved by the features of the characterising portion of the claim is according to the appellant to reduce the curing time, and according to the respondent to reduce the curing time whilst maintaining conductivity and hence weldability.

The Board agrees with the respondent, noting that weldability is a requirement for instance in the car industry which is mentioned in D2, and the skilled person would have to fulfil this requirement.

- 1.5 With regard to the feature that the curing takes place in less than three seconds the appellant argued that the skilled person would be attempting to shorten this time because it could determine the speed of the production line and so he would always want to reduce this so that the curing of the paint does not become a limitation on the production line. The respondent had argued that the curing times in the process known from D2 were greater than three seconds but acknowledged that there would be a desire to reduce this time.

In the view of the Board the skilled person would want to reduce the curing time for the reasons explained by the appellant and the time of three seconds in fact is a result of the other feature, i.e. the minimum energy density, rather than an independent feature. This point was also made by the appellant. As indicated by the appellant this feature in fact describes a desire that the skilled person would want to fulfil.

- 1.6 The crucial question therefore is whether the skilled person would increase the energy density for the existing near infrared radiation compared to existing levels in order to solve the problem. The respondent also considered in its letter of 22 July 2010 (see page 2, last paragraph) that this was the main distinguishing feature of the claim.

According to the respondent the energy density in the process of D2 would have been approximately 170 kW/m² (see letter of 26 January 2004, page 2, filed during grant proceedings and refiled in the opposition proceedings with letter of 20 September 2007).

The appellant did not dispute this finding regarding the energy density in D2 but argued that in 1985 when D2 was published this would have been the maximum value for the lamps then available. In the fifteen years to the filing date of the patent in suit (no priority was claimed) the power of the lamps available on the market had increased considerably so that at the filing date it was possible to use more powerful lamps made by IndustrieSerVis GmbH. The appellant pointed out that it is indicated in D3 (see page 1387, right hand column, first paragraph) that these lamps could deliver up to 15 MkW/m², i.e. 15.000 kW/m², which is well above the minimum specified in claim 1. This was not disputed by the respondent.

D3 is a report of a symposium organised by that company on the applications for such lamps. Their suitability for use in the drying process of paint is set out in the paragraph bridging pages 1378 and 1379. It is also explained that they are particularly useful in this respect since they can make the paint dry from the inside out due to the radiation which reaches the substrate being reflected therefrom back into the paint from the bottom.

The Board agrees with the appellant that, animated by D3, the skilled person would want to apply the more powerful lamps available at the filing date to the process known from D2 in order to reduce the curing time.

The principal argument of the respondent is that there was a prejudice for the skilled person against raising

the energy density since he would be afraid that this could negatively affect the weldability of the painted sheets.

The Board cannot agree with this argument. In a situation where the skilled person can expect to solve a problem, here reducing curing time by using a more powerful lamp, a prejudice can only then arise when the skilled person is certain that the measure will not work. A mere argument that he would be afraid that it would not work cannot be considered sufficient to prevent him from trying the measure since the benefits of success are considerable.

Also the argument of the respondent relies on tests that it carried out measuring the conductivity. The first test was performed with induction heating and hence would not produce a prejudice against near infrared radiation heating, which by its nature is different in its heating effect on the paint, cf. D3, figure 2. The second test also applies the heating to sample B differently to the manner described in D2, i.e. it is applied to the backside. These tests do not therefore show a prejudice against applying a higher energy density of near infrared radiation in the same manner as in D2, i.e. by radiation onto the paint. Moreover, a prejudice should be proven to be the common thinking, e.g. by citing handbooks, rather than arising from the results of a particular type of testing not even publically available at the filing date.

- 1.7 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step in the sense of Article 56 EPC.

First auxiliary request

2. *Inventive step*

2.1 Claim 1 of this request includes the extra feature that the sheets that are produced are bake hardenable.

2.2 The appellant accepted that neither D2 nor D3 explicitly mention sheets that are bake hardenable. It pointed out, however, that D2 refers to using the curing method in the production of metal sheets for the car industry and that it is a requirement of the car industry for pre-painted sheets that they should be bake hardenable.

2.3 The respondent accepted that it was a requirement in the car industry that the sheets are bake hardenable, but it considered that this requirement added to the problem since it was desired that the curing time be reduced whilst retaining this function.

2.4 The Board does not find the argument of the respondent to be convincing. According to paragraph [0040] of the patent in suit (paragraph [0043] of the application as published) the property of being bake hardenable is lost if the curing time is too long. The Board has already indicated with respect to the main request that there existed a desire to reduce the curing time. Since this reduction would also ensure that the sheets remain bake hardenable the extra feature is one which is automatically already achieved with the features of claim 1 of the main request, which has already been found to lack an inventive step (see point 1 above).

- 2.5 Therefore, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Second auxiliary request

3. *Inventive step*

- 3.1 According to claim 1 of this request there is a pre-treatment step before the painting step.

- 3.2 As pointed out by the appellant and acknowledged by the respondent a pre-treatment is known from D2 (see page 7, lines 8 to 14 and page 8, lines 1 to 8 where the particular treatments are discussed).

The appellant considered that D2 therefore removed any prejudice against applying near infrared radiation where a sheet has been pre-treated.

- 3.3 The counterargument of the respondent was that the feature increased the prejudice for the skilled person since even if he considered that increasing the energy density for the near infrared radiation might work on a painted sheet he would not expect to be able to maintain weldability where the sheet has been pre-treated.

The respondent further considered that the adhesion to the pre-treatment layer was improved by the higher energy density.

3.4 The Board cannot agree with the arguments of the respondent regarding a prejudice for the reasons already explained above with respect to the main request. The Board also does not consider that it has been shown that this prejudice would have been so changed by the presence of a pre-treatment that the skilled person would have considered that it was impossible to maintain the weldability when applying near infrared radiation of increased energy density to a painted pre-treated sheet. D2 already includes a pre-treatment so that the argument of the respondent that the skilled person would expect a problem at the interface between the pre-treatment layer and the paint layer when using near infrared radiation is not well founded.

With respect to the allegedly improved adhesion of the paint to the pre-treatment layer the Board notes that this was not proven. Moreover, this would only be an advantage resulting from a method that was already obvious for other reasons.

3.5 Therefore, the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Fourth auxiliary request

4. *Inventive step*

4.1 According to claim 1 of this request the pre-treatment layer is heavy metal free. As pointed out by the appellant, in D2 (see page 8, lines 1 to 8) the pre-treatments proposed therein are phosphate and chromate

treatments, whereby a phosphate treatment is free of heavy metals.

In the time between the publication date of D2 and the priority date of the patent in suit there was a move towards making production methods more environmentally acceptable, which included avoiding heavy metals. The skilled person would thus at the filing date prefer the phosphate treatment over the chromate treatment.

- 4.2 The respondent argued that heavy metal free treatments are more susceptible to deterioration of conductivity and hence weldability so that the skilled person would be even less inclined to increase the energy density with this type of pre-treatment.
- 4.3 The Board cannot agree with this argument of the respondent. Quite apart from the fact that it represents an unproven allegation the fact that the car industry was requiring heavy metal free pre-treatments means that the skilled person would not be influenced by fears that there could be problems with such pre-treatments at high energy density since he knew that this was required and hence would do this.
- 4.4 Therefore, the subject-matter of claim 1 of the fourth auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders