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DECISION
of 12 February 2004

Case Number: T 0524/99 - 3.4.2

Application Number: 92912639.9

Publication Number: 0589996

IPC: C25F 3/04

Language of the proceedings: EN

Title of invention:
Treating Al sheet

Patentee:
ALCAN INTERNATIONAL LIMITED

Opponent:
Hydro Aluminium Deutschland GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - yes"

Decisions cited:
-

Catchword:
-



Case Number: T 0524/99 - 3.4.2

DECISION
of the Technical Board of Appeal 3.4.2
of 12 February 2004

Appellant:
(Proprietor of the patent)

ALCAN INTERNATIONAL LIMITED
1188 Sherbrooke Street West
Montreal
Quebec H3A 3G2 (CA)

Representative:

Wilkinson, Stephen John
Stevens, Hewlett & Perkins
1 St. Augustine's Place
Bristol BS1 4UD (GB)

Respondent:
(Opponent)

Hydro Aluminium Deutschland GmbH
Ettore-Bugatti-Strasse 6-14
D-51149 Köln (DE)

Representative:

Schüll, Gottfried, Dipl.-Phys.
COHAUSZ & FLORACK
Patent- und Rechtsanwälte
Bleichstrasse 14
D-40211 Düsseldorf (DE)

Decision under appeal:

Decision of the Opposition Division of the
European Patent Office posted 11 March 1999
revoking European patent No. 0589996 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: A. G. Klein
Members: M. A. Rayner
V. Di Cerbo

Summary of Facts and Submissions

- I. The appellant (patentee) appealed against the decision of the opposition division to revoke European patent No. 589 996 (application No. 92 912 639.9, International publication number WO 92/22688). The patent concerns treating of aluminium sheet.
- II. Amongst the documents present in the proceedings before the opposition division, there is included:
- D1: EP-A-0 096 347 (published application)
- Also referred to in the present decision is
- D1': EP-B-0 096 347 (patent as granted).
- III. The independent claim of the patent as granted, upon which the decision of the opposition division was based is worded as follows:

"Use of an added component selected from Hg, Ga, In, Sn, Bi, Tl, Cd, Pb, Zn and Sb in a method of electrochemically roughening an aluminium metal sheet for use as a lithographic plate support, which method comprises subjecting the sheet in an electrolyte to an alternating current treatment to roughen the surface of the sheet, said component being present, in the sheet at a concentration of 0.01 - 0.5 % by weight and/or as a coating on the sheet and/or in combined form in solution in the electrolyte at a concentration of 0.001 M to 0.1 M, to increase the rate of electrochemical roughening as measured by charge input, the alternating current treatment being continued until

a charge input of 35-75 kCm^2 has been applied, or up to 82 kCm^2 in the case of nitric acid/boric acid electrolytes, and the aluminium metal sheet being recovered in an electrochemically roughened state."

- IV. Point 14 of the Minutes to the oral proceedings before the opposition division recites:

"When asked as to whether the charge distinction over document D1 was in itself sufficient to support inventive step, Mr Pennant {former representative of the patentee} indicated this to be a trivial difference but not the only distinction over document D1."

- V. The opposition division found that the subject matter of claim 1 was novel because the feature "until a charge input of 35-75 kCm^{-2} has been applied, or up to 82 kCm^{-2} in the case of nitric acid/boric acid electrolytes" was not disclosed in document D1, which does not explicitly disclose the technical effect involved in the feature "to increase the rate of electrochemical roughening as measured by charge input". The division was, however, of the view that the subject matter of claim 1 lacks an inventive step because the technical effect upon which it is based is obvious in view of document D1, an increase in etch rate as a result of addition of Sn, In, Ga and Zn rendering addition of such elements obvious in electrochemical roughening. Any counter argument of the patentee based on a different attack of the etch process is flawed because the claims of the patent do not exclude chemical etching before the electrochemical etch treatment.

VI. The appellant requested setting aside of the decision and maintenance of the patent as granted or in amended form on the basis of a first to third auxiliary request. The respondent requested the appeal be dismissed. Both parties requested oral proceedings on an auxiliary basis, such proceedings being appointed consequent thereto.

In a communication attached to the summons, the board informed the parties that if filing of further submissions were intended, this should be done promptly (at least one month before the oral proceedings). Late submissions of any description from either side, especially if so complex as to delay unduly or prevent resolution of the issues at the oral proceedings would run the risk of not being taken into consideration by the board.

Towards the end of the submissions during the oral proceedings, the respondent requested that document D1' be introduced.

VII. According to the appellant, the patent in dispute is directed to the use of a family of superactivating elements to increase electrograining response, generally in acid electrolytes, of aluminium alloy sheets intended for use as lithographic plate supports. From the section starting at the bottom of column 3, starting with a smooth sheet, i.e. without any chemical etching, it can be seen that total charge input is reduced compared with conventional charge input. Claim 1 of the patent in dispute is characterised over the disclosure of document D1 by (1) being an electrochemical roughening method, not a chemical

dissolution method, (2) use of an added component to increase the rate of electrochemical roughening, and (3) the charge input of 35-75 kCm⁻². The addition of a superactivating element accelerates the rate of electrochemical dissolution of aluminium. It is important to realise that the present claim is a use claim, i.e. the use of the added components to increase the rate of roughening the sheet. It is not a claim to the components in general.

The mechanisms of chemical dissolution and of electromechanical etching are generally quite different. With respect to document D1, iron does increase the rate of chemical dissolution but does not have any effect on rate of electrochemical etching. A disclaimer of chemical etching is contained in column 1, line 30 of the patent. Document D1 gives no hint that a rate of electrochemically roughening like the patent can be achieved and the charge input disclosed is too little to achieve roughening. Document D1 teaches that small amounts of Sn, In, Ga or Zn do not substantially influence solution velocity. In the written appeal proceedings, the appellant submitted that notwithstanding paragraph 14 of the minutes of the oral proceedings before the opposition division, the charge distinction over document D1 is itself sufficient to support inventive step. An experimental report filed by the respondent before the first instance was an invalid comparison. During the oral proceedings before the appeal board, the appellant indicated the context of the content of paragraph 14 was not known by the new representative and that thus was not relevant to the appeal proceedings. Document D1' was filed too late and should not be admitted into the proceedings.

VIII. According to the respondent, claim 1 of the patent does not exclude chemical etching as for example column 1, line 30 of the patent in dispute does not limit the subject matter of the patent in the sense of a disclaimer. The same basic reactions take place in electrochemical and chemical etching, increased dissolution indicating to the skilled person that elements involved also accelerate the reaction in electrochemical etching.

Document D1 is concerned with chemical and electrochemical treatment of aluminium. No adequate definition of charge input is given in claim 1 because no attention is given to a number of parameters (electrolyte condition, electrolyte flow, form of alternating current, current density and rounded graining times). In the context of non-reproducible results, the respondent also referred to test reports filed before the first instance according to which Ga and Zn did not increase electrochemical roughening. As the skilled person knows the surface volume removed in electrochemical roughening is proportional to the charge input, a corresponding choice is obvious from document D1, the values of the patent only being routine and arbitrarily chosen as the reasons for the choice are not given. It is also on record that the numerical values of charge input had been acknowledged as trivial by the appellant. Discussion of charge density in the description of the patent is, in contradiction to the importance given to it in the appellant's case, in fact rather insignificant.

Values of 0.01 to 0.5% are given for component weight percentage in claim 1 of the patent, but 0,02-0.1% are particularly mentioned and the examples are oriented to the lower limit, these being said to have to charge inputs in the range claimed. The value of charge input claimed is thus rather obscure for the whole range of component weight percentage towards the upper end claimed. What remains in the present claim, i.e. the statement of advantage is not adequate as delimitation without any concretisation of features concerned.

Document D1 discloses chemical etching and at least also electrochemical roughening, page 10 and claims 1 to 5 indicate to the skilled person just electrochemical roughening. Document D1, discloses substantial acceleration of etching on pages 5 and 6, surely meeting the patent which mentions column 3, line 20, at least 5% and often 10-40%. It must also be borne in mind that the second reference to solution velocity in document D1 does not simply say "not" but "not substantially", in other words, consistent with the first reference solution velocity is still accelerated.

Claim 1 uses the word "comprises" in association with the obscure feature about charge input in claim 1, and having regard to the components it is not clear that only electrochemical roughening is concerned, low values of concentrations also being given for certain elements in document D1. There is also no reason to believe that any roughened state after the claimed use should be the last stage of the roughening process. The respondent also made some general references in its submissions to other documents in relation to process conditions.

The respondent drew the attention of the board to claims 2 and 3 of document D1', worded as follows:

"2. The support as claimed in Claim 1, characterised in that its surface is chemically etched or electrochemically etched.

3. The support as claimed in Claim 1, characterised in that its surface is chemically etched and electrochemically etched."

The respondent saw, in view of the word "or" in claim 2 thereof as opposed to "and" in claim 3, confirmation of his view that the skilled person understands that chemical etching is not necessary. The respondent declared that no further disclosure differing in this sense from document D1 was present in document D1'. Thus, document D1', despite being filed late, should be taken into the proceedings.

- IX. The wording of the claim according to the main request is given in section III above, that of the auxiliary requests is not given as it is not necessary for the present decision (see point 12 of the reasons below).
- X. At the end of the oral proceedings, the board gave its decision.

Reasons for the Decision

1. The appeal complies with the provisions mentioned in Rule 65(1) EPC and is therefore admissible.

2. As pointed out by the opposition division, the numerical values for charge input are not met by the disclosure of document D1, so the novelty of the subject matter of claim 1 was never in dispute. So far as point 14 of the Minutes to the oral proceedings before the opposition division is concerned, the board agrees with the appellant, that the context is not clear and that therefore it can be disregarded in assessing inventive step in the appeal proceedings. The problem solved by the present invention is to reduce treatment time of an aluminium metal sheet for use as a lithographic plate support.

3. The present case has focussed mainly on the question of inventive step in relation to document D1. The two main areas of dispute have been
 - (a) whether document D1 renders obvious use of an added component selected from Hg, Ga, In, Sn, Bi, Tl, Cd, Pb, Zn and Sb to increase the rate of electrochemical roughening in a method of electrochemically roughening an aluminium metal sheet for use as a lithographic plate support, and
 - (b) whether the subject matter of claim 1 in dispute excludes chemical etching.

4. When considering point 3(a), it is apparent from the discussion at the beginning of document D1 that printing plates are usually subjected to a treatment for roughening their surfaces, called graining, to ensure good intimate contact between the aluminium plate and a light sensitive film to be provided thereon

and improve water retention in non-image areas (page 1, line 6 et seq.). The requirements of the roughening are thus defined in document D1. A number of graining processes are mentioned (mechanical, chemical, electrochemical), all of which have disadvantages ascribed thereto.

The aluminium alloy then envisaged in the teaching of document D1 is etched chemically with an optional subsequent electrochemical etching step (page 6, last paragraph). The aluminium alloy according to document D1 is said to show a good solution velocity for chemical etching treatment and contains an intermetallic compound capable of accelerating formation of uniform pits (page 4, lines 14 to 17). Chemical etching treatment of the plate produces uniformly and densely distributed pits on its surface. In order to accelerate solution velocity of aluminium, it is desired to enlarge the local cathode area as large as possible, then to render the local anode less precious, the former taught to be achieved by incorporation of - to use the expression of document D1 - "much" impurities such as 0.20 to 1.0% by weight of Fe and, preferably, further addition of 0.1 to 2% of Cu and/or 0.1 to 0.6% of Mg (top of page 5).

Addition of elements such as Sn, In, Ga and Zn renders a matrix electrochemically less precious, thus accelerating solution velocity. Plates containing these elements may be employed for relief printing plates where a pattern with a depth of several mm is required, whereas with lithographic plates the depth is several microns at most, which means that the pit pattern must be fine (last paragraph, page 5). It was - again to use

the expression of document D1 - surprisingly found that addition of "small" amounts of Sn, In, Ga or Zn series element as described above to Fe and, optionally Cu and/or Mg, alloys renders the resulting pit pattern extremely fine though solution velocity is not substantially influenced.

The surface of the chemically etched aluminium plate has uniformly and densely distributed pits having an average depth of 1 to 10 μm and can itself be practically used as a lithographic printing plate. However, a support for a lithographic printing plate having improved printing durability, staining resistance, and tone reproducibility can be produced by subjecting the surface to electrochemical etching treatment in an electrolytic solution to obtain secondary pits having an average depth of 1 μm or less uniformly and superimposedly distributed. If the pits have a depth of more than 1 μm , the primary pits are destroyed and suffer reduction of substantial pit depth, adversely affecting printing durability and water retention. As a general guide, it can be said that an electrolytic solution having a concentration of 1 to 80 wt%, a solution temperature of 5 to 70°C, a current density of 0.5 to 60 ampere/dm², a voltage applied of 1 to 100 v and an electrolyzing time of 10 to 100 seconds can produce a preferable result. Document D1 also discloses a number of numerical examples (see for example Table II).

5. Document D1 thus defines what is required of the complete roughening process and since all the references to electrochemical etching in the solution offered by document D1 are associated only with the

smaller secondary pits (depth 1 μm or less), the argument of the respondent that document D1 renders obvious roughening by electrochemical etching alone is not convincing as the larger primary pits (1 to 10 μm) essential to the roughening and which are already "uniform", have always first had to be created. Moreover, the rather low charge input of 10 kCm^{-2} is not sufficient for the entire roughening process. There is therefore no reason to believe overall treatment time is reduced. In addition, the first reference to accelerating solution velocity in relation to Sn, In, Ga and Zn and in the context of chemical etching is, so far as amount is concerned, in the context of "much" as mentioned in connection with Fe, Cu and Mg, whereas the reference to solution velocity surprisingly not being substantially influenced occurs in the context "small" amounts. Although there is scope to argue about exactly what is meant, the board considers it reasonable to suppose that the skilled person is taught that small amounts, not unlike those of the patent in issue, do practically not influence solution velocity, the word "substantially" being a customarily used qualifier indicating that any influence is negligible. In the context of document D1, the board was not convinced that the skilled person sees chemical etching and electrochemical roughening as basically the same process. Therefore, contrary to the view of the opposition division, a hint towards accelerating electrochemical roughening is not given by references to solution velocity in relation to the chemical etching. The board therefore reached the view that, on balance and without knowledge of the disclosure of the patent in issue, there is in document D1 no suggestion towards the use claimed, the authors simply did not

realise it, and that thus the question raised in section 3(a) should be answered in the negative.

6. Claim 1 of the patent in issue refers to use of an added component ... in a method of electrochemical roughening an aluminium metal sheet for use as a lithographic plate support... "to increase the rate of electrochemical roughening", "the aluminium metal sheet being recovered in an electrochemically roughened state". It is true that the word "comprising" is used, which can be but is not necessarily exclusive. However, the board considers this a rather formalistic point as the description contains a number of reference excluding chemical etching in such terms as "not envisaged here" in column 1, line 31 or "starting with a smooth sheet" in column 3, line 57. The skilled person knows what roughening is required for aluminium sheet for use as a lithographic plate support and the description teaches the skilled person that the entire roughening is achieved electrochemically. The board was therefore convinced by the argument of the appellant and therefore sees no reason to assume chemical etching is not excluded. In addition, as the sheet in roughened state is recovered, the board sees no reason to think there a subsequent step is necessary for roughening.

7. Only in the light of an *ex post facto* analysis would there seem to be a reason to argue that the claim at issue does not exclude chemical etching, i.e. that the roughening is not done solely electrochemically and this reason would be to bring it closer to the disclosure of document D1. That this is the case is underlined by making chemical etching (explicitly excluded in the patent itself) the preferred choice

over for instance mechanical roughening with a wire brush (not explicitly excluded by the patent). An approach involving hindsight is not persuasive in arguments as to lack of inventive step.

8. The board therefore reached the view that question 3 (b) should be answered in the positive. Other parameters which could play a role, such as electrolyte condition, electrolyte flow, form of alternating current, current density and rounded graining times and the like are not pertinent to assessment of inventive step in the present case, because these are not relevant to use (as opposed to non use) of the components to which the claim is directed. General references in the submissions of the respondent to other documents offered no reason for the board to change this view.
9. The board was therefore satisfied as to inventive step of the subject matter of claim 1 according to the main request. By reason of their dependence, the same conclusion applies to the dependent claims.
10. The parties dealt with document D1 at length in the appeal procedure. The discussion led the board to reach the conclusion that chemical etching is an essential part of the teaching to the skilled person given by this document. Towards the end of the discussion at the oral proceedings, the respondent relied on the word "or" in claim 2 of document D1' as a difference in teaching justifying late introduction into the proceedings. The view of the board was that this request was too late for its introduction to be fair to the other party as this would have involved beginning a whole range of new and complex discussions about any

possibilities as to what this word might mean to the skilled person consistent with chemical etching being essential to the teaching and thus would only have tended to delay but not change the decision. Therefore, the risk of the submission not being taken into consideration, as referred to by the board in the communication annexed to the summons to oral proceedings, was resolved to the disadvantage of the respondent.

11. The submissions of the respondent in relation to its view of the obscurity of charge input with reference to concentration in the claim are not relevant to the decision. This is because these features do not result from an amendment in the opposition proceedings and the opposition was based on Article 100(a), the board thus having no possibility of pursuing either clarity or sufficiency, whatever its view of these issues might be. The test report mentioned by the respondent was also not relevant to inventive step as it was not submitted as prior art.

12. Since the board accepted the main request of the appellant, there was no need to pursue further the auxiliary requests of the appellant.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent as granted.

The Registrar:

The Chairman:

P. Martorana

A. G. Klein

