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Datasheet for the decision of 10 December 2013

Case Number: T 2414/10 - 3.3.05

Application Number: 00951046.2

Publication Number: 1292724

IPC: C25D3/56, C25D17/10

Language of the proceedings: EN

Title of invention:
ZINC-NICKEL ELECTROPLATING

Patent Proprietor:
Coventya, Inc.

Opponent:
Atotech Deutschland GmbH

Headword:
Zn-Ni plating/Coventya

Relevant legal provisions:
EPC Art. 56, 84
RPBA Art. 12(4)

Keyword:
Admissibility of a late-filed request before the board (yes) - request not admitted before the department of first instance: discretion exercised in an unreasonable way
Clarity (yes) - use of a term having a well-recognised technical meaning
Inventive step
- main and first auxiliary request (no) obvious solution
- Second auxiliary request (yes) non obvious alternative

Decisions cited:
T 0386/89, T 1467/11

Catchword:

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Case Number: T 2414/10 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 10 December 2013

Appellant: (Patent Proprietor)	Coventya, Inc. 4639 Van Epps Road Brooklyn Heights OH 44131-1049 (US)
Representative:	Wagner, Karl H. Wagner & Geyer Partnerschaft Patent- und Rechtsanwälte Gewürzmühlstrasse 5 80538 München (DE)
Respondent: (Opponent)	Atotech Deutschland GmbH Erasmusstrasse 20 10553 Berlin (DE)
Representative:	Albrecht, Thomas Kraus & Weisert Patent- und Rechtsanwälte Thomas-Wimmer-Ring 15 80539 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 8 November 2010 revoking European patent No. 1292724 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
D. Prietzel-Funk

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division revoking European patent No. 1 292 724 on the grounds that claim 1 of both requests (main and first auxiliary) then on file did not meet the requirements of Article 56 EPC.

Further, the claims of the second auxiliary request filed during the oral proceedings were not deemed admissible under Article 114(2) EPC.

II. Claim 1 of the main request (also claim 1 as granted) reads as follows:

"*1. An apparatus for applying a zinc-nickel electroplate to a workpiece comprising:*
(a) a zinc-nickel electroplating bath comprising an amine additive and having a pH more than about 14;
(b) a cathode workpiece in said bath;
(c) an anode assembly in said bath comprising:
(i) an enclosure defining an anolyte compartment, at least a portion of the enclosure being an ion exchange membrane;
(ii) an anolyte in said compartment; and
(iii)an insoluble metal anode immersed in said anolyte;
wherein the anolyte is a conductive salt or base solution and the anode is a metal or metal coating selected from the group consisting of nickel, cobalt, iron, chromium and alloys thereof."

Claim 1 of the auxiliary request differs therefrom in that the anolyte is further defined as being "*a sodium or potassium hydroxide solution comprising 50 to about 760 grams per liter sodium or potassium hydroxide*".

III. The decision of the opposition division can be summarised as follows:

The subject-matter of claim 1 was novel because at least the feature defining the anolyte as "a conductive salt or base solution" was not disclosed in document

D1: DE 198 34 353 A1,

which represented the closest state of the art to the claimed subject-matter.

The technical problem underlying the patent in suit was to provide an alternative apparatus or process for applying a Zn/Ni electroplating. The alleged surprising effects (dangerous combination of an apparatus comprising an alkaline plating bath and an acidic anolyte; safely plating without generating cyanides) underlying the claimed subject-matter were obvious inter alia from document D1 in combination with the teaching of document

D2: DE 3 712 511 A1.

The use of a membrane and the specification that the anolyte could comprise an acid, salt or base were furthermore suggested in documents

D5: US 5 162 079 and

D6: WO 98/40 539 A1.

The subject-matter of claim 1 of the first auxiliary request also lacked an inventive step for the same reasons as claim 1 of the main request.

The introduction of features from the description into the second auxiliary request submitted during the oral proceedings created uncertainty, because it was "impossible to decide whether this amendment would provide a technical contribution to the subject-matter of the opposed patent or whether it merely limits the protection conferred by the patent as granted".

Moreover, it could not be excluded that the amendment introduced unsearched subject-matter in order to meet the patentability criteria of the EPC. Since this request had been filed at the end of the oral proceedings, it was late-filed and not admitted into the opposition proceedings under Article 114(2) EPC.

IV. With is grounds of appeal dated 11 March 2011, the patent proprietor (hereinafter "the appellant") contested the decision of the first instance and filed a new set of claims as a second auxiliary request along with new documents.

Claim 1, 5 and 6 of the second auxiliary request read as follows:

"*1. An apparatus for applying a zinc-nickel electroplate to a workpiece comprising:*
(a) a zinc-nickel electroplating bath comprising an amine additive and having a pH more than about 14;
(b) a cathode workpiece in said bath;
(c) an anode assembly in said bath comprising:
(i) an enclosure defining an anolyte compartment, at least a portion of the enclosure being an ion exchange membrane;
(ii) an anolyte in said compartment; and
(iii)an insoluble metal anode immersed in said anolyte;
wherein the anolyte is a sodium or potassium hydroxide

solution comprising 50 to about 760 grams per liter sodium or potassium hydroxide and the anode is a mild steel, a steel alloy, or an iron chromium alloy."

"5. A process for applying a zinc-nickel electroplate to a workpiece comprising the steps of:
(a) providing the apparatus of claim 1; and
(b) applying a potential to the anode and cathode workpiece of said apparatus to cause a current flow from the anode to the cathode and plating of said workpiece."

"6. A process for applying a zinc-nickel electroplate to a workpiece comprising the steps of:
(a) providing a zinc-nickel electroplating bath comprising an amine additive and having a pH more than about 14;
(b) positioning a cathode workpiece in said bath;
(c) providing an anode assembly in said bath comprising:
(i) an enclosure defining an anolyte compartment, at least a portion of said enclosure being an ion exchange membrane;
(ii) an anolyte in said compartment; and
(iii) an insoluble metal anode immersed in said anolyte, wherein the anolyte is a sodium or potassium hydroxide solution comprising 50 to about 760 grams per liter sodium or potassium hydroxide and the anode is a mild steel, a steel alloy, or an iron chromium alloy,
(d) applying a potential to said anode and cathode to cause a current flow from the anode to the cathode through said ion exchange membrane."

Claims 2 to 4 and 7 to 9 represent specific embodiments of claims 1 and 6, respectively, on which they depend.

V. With a letter dated 30 September 2011, the opponent (hereinafter "the respondent") submitted its observations along with five new documents D10 to D14, the following being relevant for the present decision:

D10: Ludwig Hartinger, Handbuch der Abwasser- und Recyclingtechnik für die metallverarbeitende Industrie, pages 491 to 504 and 510 (1991)

D12: Hugo Krause, Galvanotechnik, page 86 (1956)

D13: Praktische Galvanotechnik, page 117 (1984).

The respondent argued in particular that the claimed subject-matter was an obvious alternative to the apparatus and process disclosed in D1, and so lacked inventive step under Article 56 EPC.

VI. With letter dated 14 June 2012, the appellant requested the board not to admit documents D10 to D14 into the proceedings, because they were filed late.

VII. On 7 May 2013, the respondent filed a new document D15 and requested the board not to admit the second auxiliary request (filed with the grounds of appeal) into the proceedings. Further it contested the clarity and inventive step of the claims of this request, arguing firstly that the term "mild steel" was not clear, and secondly that claim 1 was obvious in view of the disclosure of document D1 taken in combination with the teaching of documents D10, D12 and D13.

VIII. With letter of 12 September 2013, the appellant requested the board not to admit document D15 into the proceedings.

IX. At the oral proceedings, which took place on 10 December 2013, the respondent objected that claim 1 of the main request lacked novelty. The board observed that the novelty issue had already been decided against the respondent by the first instance and so, since it was not appellant in these proceedings, this issue could not be reintroduced into the appeal proceedings. The discussion, although addressing the issues of clarity and admissibility of the second auxiliary request, therefore concentrated essentially on inventive step, starting from document D1 as representing the closest state of the art.

X. After closure of the debate, the chairman established the parties' requests as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims as granted (main request) or, alternatively, on the basis of the claims according to the first auxiliary request dated 9 September 2010 or, on the basis of the set of claims according to the second auxiliary request filed on 11 March 2011 with the grounds of appeal.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Main request - Inventive step

The board, applying the problem-solution approach, came to the conclusion that claim 1 at issue does not meet

the requirements of Article 56 EPC for the following reasons:

1.1 The invention concerns an apparatus and process for zinc-nickel electroplating of a workpiece.

1.2 Document D1 - that the parties acknowledged as representing the closest state of the art - discloses (claim 1) a system for plating zinc-nickel coatings comprising an electroplating cell having an anode and a cathode and an alkaline electroplating bath with an alkaline electrolyte with metal ions for Zn-Ni coating contained within the cell, wherein an ion exchange membrane separates the anode from the alkaline electrolyte surrounding the cathode.

In the specific embodiments defined in dependent claims 3 and 4 of D1, the electroplating bath contains sulfuric acid, phosphoric acid, methanesulfonic acid, amidosulfonic acid and/or phosphonic acid as the anolyte and the anode is made of platinum-coated titanium.

1.3 As to the problem to be solved, the appellant stated that it lied in the provision of an improved apparatus and method for applying a Zn-Ni electroplating avoiding the use of expensive anode material and providing improved control of the quality and productivity of the plating line while facilitating maintenance and improving safety of the plating bath, allowing the use of low-cost liquid anolyte, thus preventing health and safety risks for the employees.

1.4 As a solution to this problem, the contested patent proposes an apparatus according to claim 1 at issue, which is in particular characterised in that

- the Zn-Ni bath has a pH of more than about 14,
- the anolyte is either a conductive salt or a base solution, and
- the anode is a metal or metal coating selected from the group consisting of nickel, cobalt, iron, chromium and alloys thereof.

1.5 As to the success of the solution, it seems plausible that the apparatus defined in claim 1 at issue is less dangerous and less expensive than the one disclosed in D1, because the substitution of the acid anolyte with a conductive salt or a base prevents the possibility of a violent acid-base reaction, and the substitution of platinum-coated titanium with a cheaper material - e.g. nickel - makes the claimed apparatus less expensive.

Although the respondent contested these conclusions overall, it did not provide substantiated arguments for its view. Consequently this contradictive view remains out of consideration.

As regards the further effects put forward by the appellant (see point 1.3 above), the board points out that according to the jurisprudence, an effect must be deduced by the skilled person from the application as filed considered in relation to the nearest prior art (see e.g. T 0386/89, catchword). This requirement is not fulfilled in the present case in particular as regards the alleged improved control of the quality and productivity of the plating line, the facilitated maintenance and improved safety of the plating bath and the use of a low-cost liquid anolyte, since these

effects - as recognised by the appellant during the oral proceedings - have no basis in the application as filed and can also not be deduced therefrom.

It follows that the problem as stated by the appellant has to be reformulated.

1.6 The problem underlying the patent in suit in the light of D1 may be defined as lying in the provision of a less dangerous and less expensive apparatus and process for zinc-nickel electroplating a workpiece i.e the one defined in the patent in suit paragraph [0005].

Indeed, this problem has been plausibly solved.

1.7 To the question whether the solution proposed by the contested patent is obvious from the state of the art, the board concludes as follows:

1.7.1 Document D1 described (see column 1, lines 1 to 22) an improvement of the process according to document D2, in which an alkaline zinc-nickel electroplating bath having e.g. the following composition was developed with the aim to achieve a uniform coating:

- 11.3 g/l ZnO
- 4.1 g/l $NiSO_4,6H_2O$
- 120 g/l NaOH
- 5.1 g/l polyethyleneimine.

According to D1 (column 1, lines 27 to 28 and 61 to 64) electroplating baths were usually operated with an insoluble nickel anode, because other materials than nickel dissolved in the alkaline electrolyte with adverse effects on the quality of the coating.

D1 also discloses (column 1, lines 32 to column 2, line 14) that after a few weeks of operation of the process according to D2, the electroplating bath separated into two phases and cyanides were detected in the bath. D1 proposed to overcome these problems by separating the anode from the alkaline electrolyte by an ion exchange membrane.

1.7.2 For the board, it is clear from the above passages that the problems arising from the process according to D2 were solved, according to D1, by the sole use of an ion exchange membrane, and not - as contended by the appellant - by the further mandatory use of an acidic anolyte and of an anode made of platinum-coated titanium.

In the board's view, since the invention in D1 is an improvement of the process according to D2, the disclosure of D1 also encompasses the features described in column 1, lines 15 to 64 of D1 as belonging to prior-art document D2, in particular the use of a specific alkaline Zn-Ni plating bath containing 120 g/l NaOH (i.e. having a pH > about 14), the use of a basic anolyte and the use of an insoluble nickel anode, in particular when the electroplating bath is basic.

1.7.3 The appellant argued that it was not obvious to replace an acidic anolyte by a basic one in an electroplating process. This view cannot be shared by the board, because for instance document D5 - which discloses a system for electroplating an alloy of two or more metals including e.g. nickel (D5, lines 21 to 25; column 4, lines 5 to 27) - clearly teaches that when the insoluble anode is separated from the plating solution by means of an anion exchange membrane, the

conductive anolyte can **either** be an acid, a base **or** a salt (D5: column 2, lines 17 to 26). For the skilled person, it follows from this teaching that the above three anolytes are clearly interchangeable.

1.7.4 From the above considerations and bearing in mind that it is common general knowledge that nickel is cheaper than platinated titanium and that the juxtaposition of two bases is less dangerous than the juxtaposition of a base with an acid, the board concludes that the skilled person finds all the ingredients in the above passages of D1 for designing a less dangerous and less expensive apparatus than the specific one disclosed in claims 1, 3 and 4 of D1, and so arriving in an obvious manner at the process according to claim 1 at issue.

1.8 It follows that claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC. The main request is therefore not allowable.

2. First auxiliary request - Inventive step

Claim 1 of this request differs from claim 1 of the main request in that the anolyte is no more defined as a "conductive salt" or "a base solution" but as "*a sodium or potassium hydroxide solution comprising 50 to about 760 grams per liter sodium or potassium hydroxide*".

The board observes that the above distinguishing feature totally encompasses the value "120 g/l NaOH" disclosed in D1 (column 1) as one of the specific Zn-Ni alkaline electroplating baths used in D2 (see also point 1.6.1 above). Since this specific Zn-Ni alkaline bath is designed to provide uniform coatings, the skilled person has particular good reasons to start

from this specific composition and so, when he is faced with the problem addressed in paragraph [0005] of the contested patent, he will arrive in an obvious manner, for the same reasons as those indicated in points 1.1 to 1.6, at the subject-matter of claim 1 of this request, which therefore also lacks inventive step within the meaning of Article 56 EPC.

The first auxiliary request is therefore also not allowable.

3. Second auxiliary request

3.1 Admissibility

The respondent referred to Rule 12(4) RPBA and decision T 1467/11, and contested the admissibility of the second auxiliary request, which was ruled inadmissible under Article 114(2) EPC by the opposition division (see point III, last paragraph, above).

Decision T 1467/11, point 3.2 of the reasons - which refers to G 0007/93, points 2.5 and 2.6, (OJ EPO 1994, 775) - ruled that when a first-instance department has exercised its discretion in a particular case, a board should only overrule it if it comes to the conclusion either that the first-instance department has not exercised its discretion in accordance with the right principles, or that it has exercised its discretion in an unreasonable way.

In the board's view, the reference to G 0007/93 in T 1467/11 does not help in the present case. G 0007/93 concerned amendments filed in **examination** and **after issuance of a communication under Rule 51(6) EPC 1973** and did not concern amendments filed during oral

proceedings before the opposition division which were not admitted on grounds of late filing.

But the board in any case takes the view that the opposition division exercised its discretion in an unreasonable way. Even if the amendment to the effect that the anode is a mild steel, a steel alloy, or an iron chromium alloy has its basis solely in the description, this amendment does not create an "insecure situation", as argued by the opposition division, because the anode was originally defined as being "a metal or a metal coating selected from the group consisting of nickel, cobalt, **iron**, chromium and **alloys** thereof". The proposed amendment is only a restriction of the above list of metals and alloys to a list of three specific iron alloys, of which two - namely mild steel and stainless steel - are explicitly used as an anode in Examples 6 and 11 of the contested patent. It is thus not surprising that the claimed subject-matter was restricted to a family of alloys explicitly used in the examples, in particular because of the cheapness of the iron alloys.

The argument that the amendment might "introduce subject-matter which was not covered by the search in order to meet the patentability criteria of the EPC" is not convincing since in opposition proceedings it is no longer the duty of the EPO to perform the search but that of the opponent. Stainless steel and mild steel having furthermore been used as specific anode materials in the examples, one could have expected the respondent's search to cover at least these particular and commonly known iron alloys.

From the above considerations, and the second auxiliary request having been filed with the grounds of appeal in

an attempt to overcome the issues raised by the opponent, the board does not see any reason not to admit it under Rule 12(4) RPBA into the proceedings.

3.2 Amendments - Allowability

No objection was raised against the allowability of the amendments. The board also does not have any concern with the allowability of the amendments proposed in this request. In particular, the amendment to claim 1 defining the anode as being "a mild steel, a steel alloy or an iron chromium alloy" has its basis in page 7, lines 20 to 22 of the application as filed.

The requirements of Article 123(2) EPC are met.

3.3 Clarity

The board cannot accept the respondent's argument that the use of the term "mild steel" in claim 1 engendered a lack of clarity, because this term has a well-recognised technical meaning in metallurgy.

Thus the claims cannot be seen as infringing the requirements of Article 84 EPC.

3.4 Novelty

The novelty of the claims of this request was not disputed. The board is satisfied that none of the cited documents anticipates the claimed subject-matter. In particular, the subject-matter of independent claims 1, 5 and 6 (and by the same token that of dependent claims 2 to 4 and 7 to 9) is novel over D1, in particular because this document does not disclose the use of an anode which is "a mild steel, a steel alloy

or an iron-chromium alloy". Thus, the claims meet the requirements of Article 54(1) and (2) EPC.

3.5 Inventive step

For the board, the claimed subject-matter meets the requirements of Article 56 EPC for the following reasons:

3.5.1 The invention concerns an apparatus and process for zinc-nickel electroplating a workpiece.

3.5.2 Such an apparatus and process are disclosed in D1 (for further details see point 1.2 above) which represents the closest state of the art and so the starting point for assessing the inventive step of the subject-matter of claim 1 at issue.

3.5.3 The problem underlying the contested patent has been identified under point 1.6 above.

3.5.4 As a solution to this problem, the patent proposes an apparatus according to claim 1 at issue, which is in particular characterised in that

- the Zn-Ni bath has a pH of more than about 14,
- the anolyte is a sodium or potassium hydroxide solution comprising 50 to about 760 grams per liter sodium or potassium hydroxide,
- the anode is a mild steel, a steel alloy, or an iron chromium alloy.

3.5.5 For the board it is credible that the apparatus defined in claim 1 at issue is less dangerous and less expensive than the one disclosed in D1, because the substitution of the acid anolyte with a base prevents the occurrence of violent acid-base reaction and the

substitution of platinum-coated titanium with a mild steel, steel alloy or an iron chromium alloy makes the claimed apparatus less expensive.

It is true that the respondent contested these conclusions. However, in the absence of concrete arguments, the board cannot present counter arguments.

3.5.6 As to the question whether or not the solution proposed by the contested patent is obvious from the state of the art, the board concludes as follows:

For the same reasons as those indicated in points 1.7.1 to 1.7.4 above, the features that the zinc-nickel bath has a pH of more than about 14 and the anolyte is a sodium or potassium hydroxide solution comprising 50 to about 760 grams of sodium or potassium hydroxide per liter cannot be seen as involving an inventive step in the sense of Article 56 EPC.

However, contrary to the respondent's assertions, the substitution of an anode made of platinum-coated titanium by the much cheaper iron alloys defined in claim 1 is not derivable in an obvious manner from the state of the art cited by the respondent for the following reasons:

- Document D10 concerns waste water treatment and recycling techniques. Page 503 thereof, which teaches that for cost reasons platinated titanium can be replaced by stainless steel as an anode material, **does not concern electroplating** but recovery of metals, in particular precious metals or non-ferrous heavy metals, from aqueous solutions.

- Document D12 (page 86, paragraph 4, Anodes), which concerns electroplating, teaches that for cost reasons a platinum anode can be replaced by a **lead or tin** anode in a nickel electroplating process, but not by one of the metals now defined in claim 1 at issue.

- Document D13 (page 117, paragraph 5.7.3.1, Anodes), which is a general handbook about electroplating, discloses that the material of the anode is dependent on the composition of the electrolyte, without however giving any further details.

For the board, the above documents do not disclose or suggest the replacement, in a zinc-nickel electroplating process, of a platinated-titanium anode by one of the three metals now defined in claim 1, with the consequence that the skilled person faced with the problem identified under point 3.5.3 (or 1.6) above would not find in these documents the solution proposed in claim 1 at issue, and so he would not arrive in an obvious manner at the subject-matter of claim 1 at issue, and by the same token at that of claims 2 to 4, which are dependent on claim 1 at issue.

Nor do the remaining documents contain any pointers towards the claimed solution to the problem stated above.

For the same reasons as those indicated above, the subject-matter of independent claims 5 and 6 (i.e. process claims) - which include all the essential features of independent claim 1 - is also not derivable in an obvious manner from the state of the art, and so it involves an inventive step, too. Claims 7 to 9

derive their patentability from claim 6 on which they depend.

It follows from the above considerations that claims 1 to 9 of this request meet the requirements of Article 56 EPC.

3.6 The second auxiliary request is therefore allowable.

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 in amended form on the basis of claims 1 to 9 according to auxiliary request 2, submitted with the letter dated 11 March 2011, and an amended description.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated