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**Datasheet for the decision
of 18 November 2019**

Case Number: T 1161/16 - 3.3.05

Application Number: 04752617.3

Publication Number: 1664360

IPC: C22C19/00

Language of the proceedings: EN

Title of invention:

COBALT-NICKEL-CHROMIUM-MOLYBDENUM ALLOYS WITH REDUCED LEVEL OF
TITANIUM NITRIDE INCLUSIONS

Patent Proprietors:

ATI Properties LLC
Fort Wayne Metals Research Products Corporation

Opponent:

Kameke, Allard von

Headword:

COBALT-NICKEL-CHROMIUM-MOLYBDENUM ALLOYS/ATI

Relevant legal provisions:

EPC Art. 54(1), 54(2), 56, 123(2), 123(3)
RPBA Art. 13(1), 13(3)

Keyword:

Amendments - added subject-matter (yes)

Novelty - auxiliary request (yes) - availability to the public
- multiple selection

Inventive step - auxiliary request (yes) - unexpected
improvement shown

Late-filed document - justification for late filing (no) -
admitted (no)

Decisions cited:

Catchword:



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Case Number: T 1161/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 18 November 2019

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 8 March 2016
rejecting the opposition filed against European
patent No. 1664360 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman E. Bendl
Members: T. Burkhardt
 S. Fernández de Córdoba

Summary of Facts and Submissions

I. The appeal lies from the opposition division's decision to reject the opposition against European patent 1 664 360 B.

II. The following documents were among those mentioned in the contested decision:

D1 US 3,356,542 A

D2a Affidavit by T L Urquart, dated 7 January 2013

D2b Affidavit by M J Walter, dated 24 January 2013

D3 Hamilton Precision Metals, "Technical Data Sheet MP35N® - LTI", 14 March 2003

D8 Affidavit by R J Myers, dated 7 September 2007

D9 Affidavit by R B Frank, dated 17 December 2015

III. The opposition division had held that the patent as granted fulfilled the requirements of the EPC.

It had held in particular that claim 3 as granted fulfilled the requirements of Article 123(2) EPC.

The opposition division had come to the conclusion that it had not been convincingly shown that alloy P4 of D2a had been made available to the public before the priority date of the patent in suit.

Moreover, novelty over D1; the alloys P1, P2 and P3 of D2a; and D8 had been acknowledged.

It had also been concluded that the requirements of Article 56 EPC were met, in particular vis-à-vis D3, even in combination with D1, and vis-à-vis the alloys P1, P2 and P3 of D2a.

IV. With its statement setting out the grounds of appeal, the opponent (appellant) further submitted, *inter alia*, the following documents:

D11 Affidavit by P Y Dirick, dated 27 June 2016
D12 Affidavit by M J Walter, dated 5 July 2016
D16 Affidavit by R B Frank, dated 13 July 2016

V. With its reply, the patent proprietors (respondents) filed a main request, which is identical to the patent as granted, as well as two auxiliary requests. All these requests are identical to those at the opposition stage.

VI. Claim 1 as granted (main request) reads as follows:

"1. A alloy comprising, in weight percent based on total alloy weight:
32.7 to 37.3 nickel;
18.75 to 21.25 chromium;
8.85 to 10.65 molybdenum;
no greater than 0.035 carbon;
no greater than 0.18 manganese;
no greater than 0.17 silicon;
no greater than 0.020 phosphorus;
no greater than 0.015 sulfur;
no greater than 1.05 iron;
no greater than 0.020 boron;
less than 30 ppm nitrogen,
less than 0.7 weight percent titanium;
at least one of: 0.05 to 0.15 weight percent aluminium;
5 to 20 ppm calcium; 5 to 50 ppm magnesium; and 5 to 50 ppm cerium; and
balance cobalt and incidental impurities."

Dependent claims 2 and 3, which depend on claim 1, read as follows:

"2. The alloy of claim 1 comprising:
33.0 to 37.0 nickel;
19.0 to 21.0 chromium;
9.0 to 10.5 molybdenum."

"3. The alloy of claim 1 or claim 2 comprising:
no greater than 0.025 carbon;
no greater than 0.15 manganese;
no greater than 0.15 silicon;
no greater than 0.015 phosphorus;
no greater than 0.010 sulfur;
no greater than 1.0 iron; and
no greater than 0.015 boron."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in the following passage (highlighted): "... and balance cobalt, at least 20 weight percent, and incidental impurities". Claims 2 and 3 are identical to claims 2 and 3 of the main request.

Claims 1 and 2 of the second auxiliary request are identical to claims 1 and 2 of the main request; claim 3 differs in that it only refers to claim 2 instead of claims 1 and 2. Independent claim 15 of the second auxiliary request has the following wording:

"15. A method of making an alloy, the method comprising:
preparing a VAR ingot having a composition according to any one of claims 1 to 11."

The dependent claims 2-14 and 16-18 of this request are directed to preferred embodiments.

VII. In addition, the following documents were submitted, *inter alia*, during the written appeal procedure:

- D17 Affidavit by L Kay, dated 21 November 2016
- D18 Affidavit by R J Myers, dated 1 December 2016
- D19 Affidavit by L Kay, dated 1 December 2016
- D20 "Agreement for Mutual Exchange of Confidential Information", dated 23 July 2002
- D21 Affidavit by L Kay, dated 1 October 2019

VIII. The arguments submitted by the appellant, as far as relevant to the present decision, may be summarised as follows:

The patent in suit did not fulfil the requirements of Article 123(2) EPC. Thus, the features "at least one of: 0.05 to 0.15 weight percent aluminium; 5 to 20 ppm calcium; 5 to 50 ppm magnesium; and 5 to 50 ppm cerium" and "balance cobalt and incidental impurities" as well as the removal of the feature "at least 20 [weight percent] cobalt" in claim 1 went beyond the original disclosure. Moreover, because of the new dependency on claim 1, claim 3 went beyond the original disclosure.

The patent in suit did not meet the requirements of Article 54 EPC in view of D1 as well as the alleged public prior uses D2 (i.e. D2a, D2b and D12) and D8. The confidential nature of the prior use described in D8 was not sufficiently proven by the respondents.

Moreover, the patent in suit did not fulfil the requirements of Article 56 EPC in view of D2 and D3, possibly in combination with D1. Experimental evidence

D9 and D16 showed indeed the absence of an unexpected effect related to the claimed subject-matter.

IX. The respondents essentially argued as follows.

Experimental results D21 should be admitted since they represented only an elaboration of the reasoning of D17.

The respondents pointed to Table 1 and page 5 of the application as originally filed to justify the direct dependency of claim 3 on claim 1.

In summary, the patent in suit and the two auxiliary requests fulfilled the requirements of the EPC.

X. The appellant requested that the decision under appeal be set aside and that the European patent be revoked.

The respondents requested that the appeal be dismissed. As an auxiliary measure, they requested that the patent be maintained as amended on the basis of one of the two auxiliary requests as filed with the reply to the grounds of appeal.

Reasons for the Decision

1. Admissibility of D21

For the following reasons, the board exercises its discretion according to Article 13(1) and (3) RPBA 2007 and does not admit D21.

D21 was filed by the respondents at a late stage of the appeal stage, i.e. about one and a half months before the date of the oral proceedings.

According to the respondents, this was a reaction to the communication according to Article 15(1) RPBA 2007. D21 aimed to counter D9 and D16 and further corroborate the presence of an unexpected effect related to the presence of at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed ranges. Thus, D21 merely expanded the reasoning already made in D17.

This argument is not convincing. Contrary to D17, D21 contains not only general considerations and allegations but also experimental results. Consequently, D21 is not merely an elaboration of the content of D17.

In D21, no comparative tests were carried out. Only alloys according to the invention comprising at least one of the deoxidising agents Al, Ca, Mg and Ce in the ranges specified in claim 1 were evaluated (see point 3 of D21). Moreover, a direct comparison between the results of D21 and D9 is not possible because, as confirmed by the respondents themselves (see D17, point 8), different "external factors" between the experimental set-ups of D9 and D21, such as different calibrations, sample preparation or environmental conditions affect the results of fatigue measurements.

Even more importantly, D21 confronts the appellant with new experimental data at a very late stage, i.e. shortly before the oral proceedings. Since D9 was already submitted at the opposition stage and D16 was submitted with the statement setting out the grounds of

appeal, the respondents had ample opportunity to file additional experimental data at an earlier stage.

For these reasons, the board exercises its discretion according to Articles 13(1) and (3) RPBA 2007 and does not admit D21.

2. Main request and first auxiliary request - amendments

For the following reason, the main request and the first auxiliary request do not fulfil the requirements of Article 123(2) EPC.

Claims 2 and 3 of the main request are identical to claims 6 and 7 as originally filed respectively, apart from the back reference in claim 3 (main request). Claim 7 as originally filed depended exclusively on claim 6 as originally filed. By contrast, claim 3 of the main request does not only depend on claim 2 but also on claim 1.

Thus, while the alloys covered by original claim 7 mandatorily had, for instance, a carbon content no greater than 0.025 wt.% *in combination* with a narrow nickel concentration range, i.e. between 33.0 and 37.0 wt.%, present claim 3 covers, *via* its reference to claim 1, alloys with this carbon content and a broader nickel concentration range, i.e. between 32.7 and 37.3 %wt. In other words, contrary to original claim 7, present claim 3 encompasses alloys with a carbon content no greater than 0.025 wt.% and nickel concentrations between on the one hand 32.7 and 33.0 wt.% and on the other hand between 37.0 and 37.3 wt.%, which were not encompassed by the claims as originally filed.

In the description, alloys with a carbon concentration no greater than 0.025 wt.% are also only disclosed in combination with the narrow nickel concentration range (page 3, lines 24-30), and there is no pointer, neither in the claims nor in the description as originally filed, that a carbon concentration no greater than 0.025 wt.% may be combined with the broader nickel concentration range between 32.7 and 37.3 wt.%.

Besides the original claims, the respondents pointed to Table 1 and page 5, lines 5-6, of the application as originally filed in this regard. However, Table 1 refers to the *narrow* nickel concentration range, and the passage on page 5 is entirely silent on the carbon and nickel contents of the alloys. Hence, this reasoning is not convincing.

As in claim 1 of the first auxiliary request, only the amount of cobalt has been further defined, the reasoning above applies *mutatis mutandis* to this request too.

3. Second auxiliary request - amendments

Since claim 3 of the second auxiliary request exclusively depends on claim 2, the objection under point 2 has become moot.

In addition, the following features in claim 1 do not go beyond the original disclosure, contrary to the appellant's assertion:

- In contrast to as originally filed, claim 1 no longer explicitly requires more than 20 wt.% cobalt.

In the appellant's view, the word "comprising" in claim 1 makes it clear that additional components such as Cu or Zr may be present.

Nevertheless, in spite of the word "comprising", the composition of the alloy is defined by the compounds listed in claim 1 with the balance being cobalt, i.e. for an alloy according to claim 1 having a cobalt content *below* 20 wt.%, it would be necessary that the impurity content exceeded at least 8.445 wt.% (= 100 wt.% minus the maximum contents of the other compounds in claim 1 and minus 20 wt.% cobalt).

However, the amount of impurities in *alloys* - as opposed to the amount of impurities in impure metals - is controlled to be "incidental", i.e. to be at low levels in order to not affect the properties of the alloy. Yet, a content of 8.445 wt.% cannot be considered a low level and is likely to affect the properties of the alloy. More importantly, the appellant, who bears the burden of proof, has provided no evidence for the existence of Co-Ni-Cr-Mo *alloys* with impurity concentrations of at least 8.445 wt.%.

Consequently, the omission of the minimum cobalt content of 20 wt.% in claim 1 does not go beyond the original disclosure.

- Concerning the further objection as to Al, Ca, Mg and Ce, it is true that claims 12 to 15 as originally filed only refer back to claim 1. However, the combined presence of more than one of these deoxidising agents in the claimed amounts is also disclosed in the last paragraph on page 23 of the application as originally filed. The expression "modified MP35N alloys of the present disclosure" in this passage indicates that it

relates to the entire invention, not only to Example 3 as held by the appellant.

- The feature "balance cobalt" in claim 1 is disclosed on page 7, lines 13-14, in combination with Table 1 (last line) of the application as originally filed.

- Alloys always contain "incidental impurities". Their presence was thus implicitly disclosed in the application as originally filed.

Since the independent claims of the second auxiliary request are identical to those of the patent as granted, the requirements of Article 123(3) EPC are also met.

4. Second auxiliary request - novelty

For the following reasons, the second auxiliary request meets the requirements of Article 54(1) and (2) EPC.

4.1 The alleged public prior use D2, i.e. in particular documents D2, D2a and D12, involves the four following alloys:

alloy	heat	invoice appended to D2a	date of invoice
P1	207480	Exhibit 1	30 October 2001
P2	207480	Exhibit 2	24 December 2001
P3	208416	Exhibit 3	25 June 2003
P4	208531	Exhibit 4	25 August 2003

4.1.1 It has not been contested that the alloys P1, P2 and P3 form part of the state of the art in accordance with Article 54(2) EPC. The invoices of these alloys are

indeed dated before the priority date of the patent in suit (5 September 2003) and, according to D2a (point 9), these alloys have been made available to the public. Consequently, these alloys do form part of the state of the art in accordance with Article 54(2) EPC.

However, according to the chemical analysis of these alloys in D2b/D12, these alloys do not necessarily contain at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed concentration ranges (see Table "Exhibit 1" referring to Heat 207480 for alloys P1 and P2 and Table "EXHIBIT 2" referring to Heat 208416 for alloy P3):

- The concentration of Al in all these alloys is too low.
- The Ca concentration in P1 and P2 is too low and in P3 lies only possibly within the region of overlap with the concentration range of claim 1.
- The Mg concentration in P1 and P2 is too high and in P3 lies only possibly within the region of overlap with the concentration range of claim 1.
- The concentration of Ce in all these alloys is unknown.

Consequently, the alloys P1, P2 and P3 do not take away the novelty of the subject-matter of claim 1 of the second auxiliary request.

- 4.1.2 The invoice of the alloy P4 (Exhibit 4 as attached to D2a) is dated only 11 days before the priority date of the contested patent. In the absence of any further proof that this alloy was made available to the public before the priority date, the appellant's allegation that the "delivery [of ordered alloys] usually occurs within one or two days of shipment from the warehouse, depending on the time of departure" (D11, point 7) is

no proof beyond reasonable doubt but rather an assumption.

Hence, the P4 alloy does not form part of the state of the art according to Article 54(2) EPC.

4.2 Furthermore, multiple selections from D1 are necessary to arrive at the subject-matter of claim 1. More particularly, it is for example necessary to select sub-ranges with regard to nitrogen, carbon and the deoxidising agents:

- While claim 1 of the patent in suit requires a nitrogen content of less than 30 wppm and a carbon content of less than 350 wppm, Examples 20, 23, 28 and 30 of D1 are silent on the nitrogen and carbon contents. D1 only states in a general manner that it is "critically important" that the alloy comprises no more than 500 ppm carbon and nitrogen (column 4, lines 69-72).

- While claim 1 requires at least one of the deoxidising agents Al, Ca, Mg and Ce in specific ranges, Example 28 discloses Al in a too high concentration, namely, between 2 and 4 wt.%. Examples 20, 23 and 30 are silent on these deoxidising agents. D1 only states in a general manner that the concentration of Al "should be limited to no more than 2%" (column 5, lines 3-5).

Consequently, D1 does not take away the novelty of the subject-matter of claim 1.

4.3 With regard to the alleged public prior use D8, according to the respondents, the alloy "35N LT®" has been delivered from June 2003, yet only for the purpose

of "testing and evaluation by a customer of Fort Wayne Metals" (D18, points 4 and 5). The confidential nature of the prior use is further confirmed by affidavit D19 (point 10; see also Exhibits B and C with the mention "confidential" as annexed to D19) and the non-disclosure agreement D20 between Fort Wayne Metals and "Customer A". Consistently, Exhibit D as annexed to D19 indicates prices of 0\$ for a large majority of the samples provided.

The appellant remarks that the respondents have not submitted non-disclosure agreements between, on the one hand, Fort Wayne Metals and, on the other hand, the "Competitor" and "Customer B", but the appellant fails to submit evidence that the "Competitor" or "Customer B" were not bound by secrecy.

According to the principle of free evaluation of evidence, the board thus concludes that the availability to the public of the alloy "35N LT®" in view of D8 prior to the priority date of the patent in suit is not proven. Hence, D8 does not form part of the state of the art in accordance with Article 54(2) EPC.

4.4 For the same reasons, the subject-matter of independent claim 15 and the dependent claims is also novel over either of D1, D2 and D8.

5. Second auxiliary request - inventive step

For the following reasons, the second auxiliary request fulfils the requirements of Article 56 EPC.

5.1 The invention relates to a Co-Ni-Cr-Mo alloy for use in surgical implants, such as stents or pacing leads for

implantable defibrillators or pacemakers (see paragraph [0001]).

- 5.2 In the appellant's view, the alloys P1, P2 and P3 of the public prior use D2 are to be considered the closest prior art.

Since D2 relates to the same technical field and has numerous technical features in common with claim 1, these alloys are indeed a reasonable starting point for assessing inventive step.

As indicated under point 4.1.1, these alloys do not comprise at least one of the deoxidising agents Al, Ca, Mg and Ce in the concentration ranges of claim 1.

- 5.3 According to the patent in suit, the problem to be solved by the invention is the provision of an alloy with improved fatigue strength and favourable manufacturability, due to the reduction in surface defects, and presenting a reduced risk of fracture or crack during cold drawing or forging (e.g. paragraphs [0001, 0004, 0009]).

The proposed solution to this problem is an alloy according to claim 1 comprising at least one of the deoxidising agents Al, Ca, Mg and Ce in specific concentration ranges.

- 5.4 Comparative tests D9 provided by the appellant indeed show an improved fatigue resistance in the relevant region for surgical implants, i.e. at a stress level around 100 ksi (see paragraph [0050] of the patent in suit) when using an alloy according to the invention, i.e. containing at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed range.

Table 3 and Figure 1 of D9 show that alloy "A" has an increased fatigue resistance at this stress level as compared to alloy "C". At a stress level of 100 ksi, the wire made of alloy "A" passes through 388419 cycles before fracture, whereas alloy "C" only passes through 253637 cycles. Similarly, at a stress level of 110 ksi, the wire made of alloy "A" passes through 139321 cycles, whereas alloy "C" only passes through 122148 cycles.

According to Table 1 of D9, alloy "A" is an alloy according to the invention with an Al concentration of 0.12 wt.%, whereas alloy "C" comprises none of the deoxidising agents in the claimed range.

Moreover, D16 shows that the cold-drawability remains high since it is possible to draw 2 km of wires "A" and "C" without fracture (point 8).

In D9 and D16, comparative experiments were carried out, i.e. using the same experimental setup and under identical conditions. Thus, in the absence of differing "external factors", such as different calibrations, sample preparation or environmental conditions between the different alloys (see D17, point 8), the results relating to alloys "A" and "C" in D9 and D16 are comparable.

The appellant is of the opinion that the improvement shown in D9 at 100 and 110 ksi is not significant. This argument is not convincing. According to paragraph [0050] of the patent in suit, it is just the stress level region near 100 ksi that is important for the use in surgical implants. Moreover, the increase in the

number of cycles before fracture at 110 ksi is 14%, and at 100 ksi it is 53%, which is substantial.

The posed technical problem is hence successfully solved.

5.5 While the use of Al and Ca in Co-Ni-Cr-Mo alloys by itself is known, e.g. from D1 (column 4, line 32, or column 5, lines 3-5), the purpose of these compounds in D1 is rather the deoxidation of the alloy.

In the appellant's view, the addition of the claimed amount of Al was merely "a matter of routine" (submission dated 4 July 2018, page 12, second full paragraph).

However, the available prior art does not suggest that the presence of at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed ranges improves the fatigue resistance of a Co-Ni-Cr-Mo alloy.

Such an effect is not mentioned in D1, let alone the specific concentration ranges of claim 1. Thus, D1 does not mention a specific Ca concentration and discloses that Al should be limited to no more than 2% (column 2, lines 1-11). This range is, however, much broader than the claimed range between 0.05 and 0.15 wt.%. Example 28 of D1 even discloses an Al concentration between 2 and 4%.

Consequently, the prior art would not have prompted the skilled person to solve the technical problem in the claimed manner. The subject-matter of claim 1 of the second auxiliary request therefore involves an inventive step within the meaning of Article 56 EPC.

5.6 In the appellant's view, D3 may also be considered the closest prior art. However, as admitted by the appellant (see the statement setting out the grounds of appeal, page 20, third paragraph), D3 differs from the subject-matter of claim 1 of the second auxiliary request in the content of nitrogen *and* in the presence of at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed ranges.

Therefore, D3 is more remote from the subject-matter of claim 1 than D2, which only differs in the presence of at least one of the deoxidising agents Al, Ca, Mg and Ce in the claimed ranges. D3 is thus not a reasonable starting point for assessing inventive step.

Even if, *arguendo*, D3 was chosen as the closest prior art, the subject-matter of claim 1 would at least be inventive for the same reasons as those indicated with regard to D2.

5.7 For the same reasons, the subject-matter of independent method claim 15 and dependent claims 2-14 and 16-18 also involves an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the claims of the second auxiliary request filed with the reply to the grounds of appeal and a description to be adapted, if needed.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated