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Datasheet for the decision of 28 September 2017

Case Number: T 2346/14 - 3.2.08

Application Number: 06776840.8

Publication Number: 1917373

IPC: C22C21/06, C22C1/02

Language of the proceedings: EN

Title of invention:
HIGH STRENGTH WELDABLE AL-MG ALLOY

Patent Proprietor:
Aleris Aluminum Koblenz GmbH

Opponent:
Constellium France/C-TEC Constellium Technology Center

Headword:

Relevant legal provisions:
EPC Art. 100(c), 100(a), 54, 56

Keyword:
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Novelty
Inventive step

Decisions cited:

Catchword:

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Case Number: T 2346/14 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 28 September 2017

Appellant: (Patent Proprietor)	Aleris Aluminum Koblenz GmbH Carl-Spaeter-Strasse 10 56070 Koblenz (DE)
Representative:	Müller Schupfner & Partner Patent- und Rechtsanwaltspartnerschaft mbB Bavariaring 11 80336 München (DE)
Appellant: (Opponent)	Constellium France/C-TEC Constellium Technology Center 40-44, rue Washington 75008 Paris (FR)
Representative:	Constellium - Propriété Industrielle C-TEC Constellium Technology Center Propriété Industrielle Parc Economique Centr'Alp 725, rue Aristide Bergès CS10027 38341 Voreppe (FR)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 28 October 2014 concerning maintenance of the European Patent No. 1917373 in amended form.**

Composition of the Board:

Chairman	C. Herberhold
Members:	M. Alvazzi Delfrate
	P. Schmitz

Summary of Facts and Submissions

I. By its decision posted on 28 October 2014 the opposition division found that European patent No. 1917373 in amended form according to auxiliary request 5 then on file, and the invention to which it related, met the requirements of the EPC.

II. Both the patent proprietor (appellant 1) and the opponent (appellant 2) lodged an appeal against that decision in the prescribed form and within the prescribed time limit.

III. At the end of the oral proceedings before the Board of Appeal, held on 28 September 2017, the requests were as follows:

Appellant 1 requested that the decision under appeal be set aside and that the patent be maintained as granted, or, in the alternative, on the basis of the set of claims according to auxiliary request 3 filed with letter of 9 March 2015 and the description as submitted during the oral proceedings before the Board.

IV. Appellant 2 requested that the decision under appeal be set aside and that the patent be revoked.

Claim 1 of the main request reads as follows:

"1. An aluminium alloy product having high strength, excellent corrosion resistance and weldability, having the following composition in wt.%:
Mg 3.5 to 6.0
Mn 0.4 to 1.2
Fe < 0.5
Si < 0.5

Cu < 0.15
Zr 0.05 to 0.25
Cr 0.03 to 0.15
Ti 0.03 to 0.2
Sc 0.1 to 0.3
Zn < 1.7
Ag < 0.4
Li < 0.5,
optionally one or more of the following dispersoid forming elements selected from the group consisting of erbium, yttrium, hafnium, vanadium, each < 0.5wt%, and impurities or incidental elements each < 0.05, total < 0.15 and the balance being aluminium, and wherein said aluminium alloy product is an aerospace product selected from the group consisting of a stringer, pressure bulkhead, fuselage sheet and lower wing panel."

In claim 1 of **auxiliary request 3** the composition has been changed as follows (amendments in respect of the main request emphasised):

"Mg ~~3.5 to 6.0~~ 3.8 to 4.3
Mn 0.4 to 1.2
Fe ~~< 0.5~~ ≤ 0.14
Si ~~< 0.5~~ ≤ 0.12
Cu ~~< 0.15~~ ≤ 0.05
Zr 0.05 to 0.25
Cr ~~0.03 to 0.15~~ 0.05 to 0.1
Ti ~~0.03 to 0.2~~ 0.05 to 0.1
Sc 0.1 to 0.3
Zn ~~< 1.7~~ 0.35 to 0.6
Ag < 0.4
Li < 0.5,

~~optionally one or more of the following dispersoid forming elements selected from the group consisting of erbium, yttrium, hafnium, vanadium, each < 0.5wt%,~~ and impurities or incidental elements each < 0.05, total < 0.15 and the balance being aluminium, ..."

V. The following documents played a role in the present decision:

D1: RU -C- 2 280 705 (with French and English translations D1a and D1b);
D4: WO -A- 01/12869;
D5: ASM Speciality Handbook "Aluminum and Aluminum Alloys", editor J.R. Davis, 1993, pp.41,45;
D6: US -B- 6,695,935;
D10: Handbook of Aluminum, Vol 1, pp.293-298, editors G.E. Totten and D.S. MacKenzie, Marcel Dekker, 2003;
D11: Aluminum Properties and Physical Metallurgy, pp. 356-357, editor J.E. Hatch, ASM, 1984.

VI. The arguments of appellant 1 can be summarised as follows:

Main request

Claim 1 did not extend beyond the content of the application as originally filed for the reasons given by the opposition division. In particular, the content of Cr and Ti respectively was disclosed in the application as preferred ranges independent of each other. Thus, the requirements of Article 123(2) EPC were met.

Although D1 disclosed examples of alloys with a composition within the claimed ranges, the thickness of the plate made from said alloys (38.1 mm, see D1b, page

14, lines 21-25) was unsuitable to produce the products according to claim 1. Indeed, D1 focused on the production of armoured products. Thus, the subject-matter of granted claim 1 was also novel.

Auxiliary request 3

Auxiliary request 3 was filed together with the statement of grounds of appeal and essentially corresponded to the version maintained by the opposition division. Hence, it should be admitted into the proceedings.

Auxiliary request 3 was also patentable.

Starting from D7 the problem to be solved was to provide good weldability, high strength, low density and excellent corrosion properties. It was not obvious to solve this problem by producing an alloy containing Cr, Ti and Zn as required by claim 1. The alloy of D7 was preferably Zn-free, so the person skilled in the art would not have considered adding Zn as taught by D6. In any event, the teaching of D6 also comprised additions of alloying elements outside the claimed scope with the result that the combination of D7 and D6 did not lead to the claimed product. D4 in turn taught a composition with more Zn and Mg than the claimed one. D5, D10 and D11 were silent on Zn and did not teach additions of Cr and Ti in the claimed amounts. Therefore, even combining the teaching of D7 with D4, D5, D6, D10 or D11 did not lead to the subject-matter of claim 1.

Also starting from D4 it was not obvious to arrive at the subject-matter of claim 1, because the prior art

did not teach the modification of the Mg and Zn content as claimed.

Likewise, starting from D1 it was not obvious to produce the claimed composition either, because D1 taught against the addition of Zn, which could thus have been done only with hindsight.

Therefore, the subject-matter of claim 1 of auxiliary request 3 involved an inventive step.

VII. The arguments of appellant 2 can be summarised as follows:

Main request

Claim 1 as granted extended beyond the content of the application as originally filed because the claimed content of Cr was originally disclosed only in combination with 0.03-0.25 Ti (Article 100(c) EPC).

Moreover, the subject-matter of granted claim 1 was not novel. D1 related to an Al-alloy whose composition overlapped with the claimed one, with examples falling within it. Since it also disclosed that said alloy could be used for the manufacture of plates for wing sheets and plane fuselages, D1 was novelty-destroying.

Auxiliary request 3

Auxiliary request 3 was late-filed and not to be admitted into the proceedings. In any event, the subject-matter of its claim 1 did not involve an inventive step.

D7 could be considered as the closest prior art. Starting from this document, the person skilled in the art would have considered D6 in order to improve corrosion resistance and strength. D6 taught the addition of Cr, Ti and Zn in accordance with present claim 1, thus arriving at the subject-matter of claim 1 in an obvious way. In the alternative, the addition of Cr and Ti was also rendered obvious by the common general knowledge of the person skilled in the art as represented by D5, D10 and D11. Finally, the claimed product was also rendered obvious by the combination of D7 and D4, because the latter document described the advantages of adding Zn.

As an alternative, the subject-matter of claim 1 was also obvious starting from D4, since the addition of Cr and Ti was rendered obvious by D6 or by the common general knowledge represented by D5, D10 and D11.

Finally, it was also obvious to arrive at the claimed product starting from D1. The person skilled in the art would have tested the effect of Zn on corrosion and added this element as taught by D6 in order to improve the corrosion resistance.

Reasons for the Decision

1. Main request

1.1 Article 100(c) EPC

Claim 1 as granted is based on originally filed claim 1 with further restrictions in respect of the content of Zr (based on claim 4), Cr (based on page 3, lines 8-11) and Sc (based on claim 10).

The passage on page 3, lines 8-14, where the claimed Cr range is disclosed reads: "To prevent adverse effects of the alloying elements Cr and Ti, Cr is in the range of 0.03 to 0.15 wt%, preferably 0.03 to 0.12 wt% and more preferably 0.05 to 0.1 wt%, and Ti preferably is in the range of 0.03 to 0.15 wt%, more preferably 0.03 to 0.12 wt% and further more preferably 0.05 to 0.1 wt%."

According to appellant 2, claim 1 comprises added subject-matter because only the Cr content has been limited as disclosed on page 3, whereas the Ti is unchanged as in originally filed claim 1. However, the following paragraph on page 3, lines 12-14 ("A further improvement of the aluminium alloy according to the invention is obtained when both Cr and Ti are present in the aluminium alloy product preferably in equal or about equal quantities") and the fact that original claims 2 and 3 deal with Cr and Ti separately make it clear that Ti and Cr can be limited independently of each other. Hence, the subject-matter of claim 1 does not extend beyond the content of the application as originally filed.

2. Main request – novelty

D1 (reference is made to D1b) discloses an Al-alloy with a composition that overlaps with the claimed one (abstract). Moreover, two examples of alloys disclosed in D1 (alloys 3 and 4 of table 1) exhibit a composition that falls within the claimed ranges.

Appellant 1 argues that the thickness of the plate made from these alloys (38.1 mm, see page 14, lines 21-25)

would be unsuitable to produce the products according to claim 1.

However, albeit focusing mainly on armoured products, D1 explicitly discloses that the suggested alloy (i.e. also alloys 3 and 4 of table 1) can be used for the manufacture of plates for wing sheets and plane fuselages (page 11, lines 15- 19). Hence, the subject-matter of claim 1 lacks novelty in view of D1.

3. Auxiliary request 3

3.1 Admission into the proceedings

Auxiliary request 3 has been filed together with the statement of grounds of appeal of the patent proprietor, i.e. at the earliest possible stage of the appeal proceedings. Moreover, its claim 1 was already the subject of the decision under appeal because it is identical to claim 1 of the version maintained by the opposition division. Indeed auxiliary request 3 departs from the version maintained by the opposition division only by the addition of some dependent claims which were already present in the granted claim set. Under these circumstances, the Board decided to admit auxiliary request 3 into the proceedings.

3.2 Inventive step

3.2.1 Starting from D7

3.2.2 D7 relates to an aluminium alloy product having high strength and excellent corrosion resistance. Said aluminium alloy product is an aerospace product such as a stringer, pressure bulkhead, fuselage sheet and lower wing panel (page 2, lines 4-12). One of the example

compositions considered in D7, alloy B, exhibits Mg, Mn Sc and Zr content in accordance with present claim 1, with the balance being Al, incidental elements and impurities (page 7, lines 12-20). However, no mention is made of adding Cr, Ti and Zn.

The problem to be solved starting from this prior art is to produce an aluminium-magnesium alloy having good weldability properties, while at the same time having high strength, low density and excellent corrosion properties (paragraphs [0010] and [0011] of the patent specification).

The product of claim 1, with a composition distinguished from that of D7 by the additions of Cr, Ti and Zn in the claimed amounts, solves this problem in particular by its Cr and Ti content, which provides good mechanical properties and superior corrosion resistance in the welded zone (see example 1, tables 1-1 to 1-4, in particular alloy C in comparison to reference alloy A).

3.2.3 Starting from D7, the prior art does not render it obvious to solve the problem above as claimed.

It is true that D6, which aims at improved strength and corrosion resistance in welded products (column 2, lines 32-43), teaches *inter alia* the addition of Zn (preferably 0.5-0.9%, column 4, lines 9-20), Cr (preferably up to 0.15%, column 4, lines 29-32) and Ti (preferably no more than 0.1%, column 4, lines 33-38). However, this is only part of the teaching of D6, which foresees also the addition of other elements outside the presently claimed composition: for instance Bi, which is not present in the composition of the patent in suit, in amounts of 0.01-0.1% (claim 1 and paragraph

bridging columns 4 and 5), and Mg in more preferred amounts of 4.6-5.6% (column 3, lines 62-67), i.e. higher than the presently claimed range. Therefore, applying the teaching of D6 would lead to a product falling outside of the scope of claim 1.

The same applies to D4, which, in addition to being completely silent on Cr and Ti additions, teaches a composition that comprises Zn, when present, in amounts of 0.6-1.5%, with the best results provided by 1.0% Zn and 5.0% Mg (paragraph bridging pages 2 and 3 and table 1 on page 4).

D5, D10 and D11 are extracts from handbooks discussing the influence of the different alloying elements, in particular Cr and Ti, in Al alloys. However, they do not teach additions of Cr, Ti and Zn in the claimed amounts to solve the given problem.

Therefore, the subject-matter of claim 1 is not obvious over D7 in combination with the teaching of documents D4, D5, D6, D10 or D11.

3.2.4 Starting from D4

As explained above, the preferred composition of D4 exhibits Mg and Zn content outside the presently claimed ranges. None of D5, D10 or D11 teaches the modification of the content of these elements within the claimed range to solve the above-mentioned problem. Hence, the subject-matter of claim 1 is not obvious starting from D4 either.

3.2.5 Starting from D1

D1 does not disclose an alloy with a composition according to claim 1, in particular in respect of the Zn content. Indeed D1 explicitly teaches against the addition of Zn, which, according to this document, negatively influences corrosion resistance (page 5, lines 7-21 and page 6, lines 10-30). Hence, it was not obvious starting from D1, without the hindsight of the present invention, to consider adding Zn in the claimed amounts to produce an alloy with good corrosion resistance. Thus, the subject-matter of claim 1 is not obvious starting from D1 either.

3.2.6 Therefore, the subject-matter of claim 1 of auxiliary request 3 involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent on the basis of the following documents:

   - Claims 1 to 9 of auxiliary request 3 filed with letter of 9 March 2015

   - Description as submitted during the oral proceedings before the Board.

The Registrar: The Chairman:

C. Moser C. Herberhold

Decision electronically authenticated