BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [ ] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 13 March 2008

Case Number: T 0524/06 - 3.2.02

Application Number: 00985067.8

Publication Number: 1242643

IPC: C22C 21/00

Language of the proceedings: EN

Title of invention:
Aluminium brazing alloy

Patentee:
Aleris Aluminum Koblenz GmbH, et al

Opponent:
ALCAN FRANCE SAS

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Novelty and inventive step - (yes) after amendments"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0524/06 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 13 March 2008

Appellant: (Patent Proprietor)
Aleris Aluminum Koblenz GmbH
Carl-Spaeter-Strasse 10
D-56070 Koblenz (DE)

Representative:
Müller, Frank Peter
Müller Schupfner & Partner
Patentanwälte
Bavariaring 11
D-80336 München (DE)

Respondents: (Opponent)
1. ALCAN FRANCE SAS
2. ALCAN RHENALU

Representative:
Marsolais, Richard
ALCAN FRANCE S.A.S.
217, Cours Lafayette
F-69451 Lyon Cedex 06 (FR)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 9 February 2006 revoking European patent No. 1242643 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: R. Ries
C. Vallet

Summary of Facts and Submissions

I. In its decision posted 9 February 2006, the opposition division held that the subject matter of claim 1 of the main request and of claim 1 of the auxiliary request then on file lacked an inventive step and revoked the European patent No. 1 242 643.

II. The appellant (patent proprietor) lodged an appeal on 7 April 2006 against the decision of the opposition division and paid the appeal fee simultaneously. The statement setting out the grounds of appeal was received at the EPO on 16 June 2006.

III. Oral proceedings took place before the Board on 13 March 2008 and focused on the discussion of novelty and inventive step, in particular having regard to the following documents:

D1a: Translation of Japanese patent publication number JP H4-128337 into French language;

D9: JP-A-01 195 263 (Abstract and D9-2 being a translation into English language)

D14: JP-A-06 0306 519 (D14-2 being a translation into English language)

The following requests were made:

The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained on the basis of the set of claims filed on 13 December 2004 (main request), or on the basis of the

first to fourth auxiliary requests, all filed at the oral proceedings.

The appellant further requested that documents D4 to D15 should not be admitted to the proceedings since they were late filed and did not come closer to the invention than D1a representing the closest prior art.

The appellant also requested that the opponent's letters dated 17 December 2007 and 13 February shall be disregarded because they stem from ALCAN France SAS, the sole opponent being however ALCAN RHENALU.

The respondent (opponent) requested that the appeal be dismissed.

IV. Claim 1 of the main request reads:

"Fin stock material formed by an aluminium alloy having the composition, in weight percent:-

Si	0.7 - 1.2
Mn	0.7 - 1.2
Mg	0.2 - 0.35
Fe	up to 0.5
Zn	0.2 - 3.0
Ni	up to 1.5
Cu	0.2 to 0.4
Ti	up to 0.20
In	up to 0.20
Zr	up to 0.25
V	up to 0.25
Sn	up to 0.25
Sn+V	up to 0.3
Cr	up to 0.25

impurities up to 0.05 each and up to 0.15 in total, Al balance."

In claim 1 of the first auxiliary request, the components In, Sn, and Cr have been deleted.

Claim 1 of the second auxiliary request reads:
"Fin stock material formed by an aluminium alloy having the composition, in weight percent:-
Si 0.7 - 1.20
Mn 0.8 - 1.1
Mg 0.2 - 0.35
Fe up to 0.5
Zn 0.2 - 3.0
Ni up to 1.5
Cu 0.2 to 0.4
Ti up to 0.20
Zr up to 0.25
V up to 0.25
impurities up to 0.05 each and up to 0.15 in total, Al balance."

Compared to this claim, the upper limit of the range for zinc has been restricted to 0.2 to 1.0% in claim 1 of the third auxiliary request.

Claim 1 of the fourth auxiliary request reads:

"Fin stock material formed by an aluminium alloy having the composition, in weight percent:-
Si 0.97
Mn 0.9
Mg 0.3
Fe 0.3

Zn 0.2
Cu 0.25
Ti 0.15
impurities up to 0.05 each and up to 0.15 in total,
Al balance, or
Si 0.97
Mn 1.1
Mg 0.3
Fe 0.3
Zn 1.0
Cu 0.25
Ti 0.15
impurities up to 0.05 each and up to 0.15 in total,
Al balance."

V. The appellant's arguments can be summarized as follows:

The claimed aluminium alloy composition for producing heat exchanger fins represented a novel selection from the alloy compositions given in D1a, D9-2 and D14-2. As to document D1a, the selected ranges were narrow and, more importantly, D1a disclosed the composition of an Al-alloy wherein the presence of one or more constituents selected from Sn, In, and Ga was mandatory. By contrast, these components were only optional in the claimed alloy. A further difference of D1a with claim 1 of the main request was the mandatory presence of copper in the range of 0.2 to 0.4% in the claimed composition. The only reference made in D1a regarding the possible addition of Cu was made on page 4, line 11, stating that Cu could be present up to 0.3%, but this was made only when discussing alloy embodiment(3) referred to in D1a on page 4, lines 8 to 11. However, samples 11 and 15 did not include copper at all.

Claim 1 of the main request was therefore novel over the disclosure of D1a.

Document D9-2 disclosed an extremely broad composition of an aluminium alloy provided for fin stock material. The exemplifying alloy F fell outside the elemental ranges of the alloy defined in the first to third auxiliary request as regards the Mn-content (1.22%) and the copper content (0.12%) that was far removed from the claimed range for Cu (0.2-0.4%). As to the technical effect, the claimed Al-alloy exhibited a significant improvement in the mechanical properties, in particular an increased post-braze 0.2% yield strength, over the conventionally used alloy AA3303 and over the alloys disclosed in D1a and D9-2.

The claimed alloys were distinguished from D14-2 by the absence of Ca, which was a compulsory component in D14-b, and by the absence of Cr, Sn, In and Zr which are all comprised in the 43 examples featuring in Tables 1 and 2 of D14-2.

The claimed alloy defined in claim 1 of the first to third auxiliary requests, therefore, satisfied the criteria for the novelty of a selection from the alloys taught in D1a, and D9-2 and were also novel over D14-2.

The same applied to the two point-like alloy compositions set out in claim 1 of the fourth auxiliary request which were neither disclosed in nor made obvious from any of the cited documents.

VI. The respondent essentially argued as follows:

Like the patent at issue, the documents D1a, D9-2 and D14-2 were concerned with an aluminium alloy for producing heat exchanger fins which exhibited an improved mechanical strength and corrosion resistance after brazing. The elemental ranges of the alloy given in D1a overlapped those of the claimed alloy. The composition of example 11 fell within the ranges set out in claim 1 of the main request except for copper which was not mentioned as a constituent. However, less than 0.3% copper could be added to the known alloy without running the risk of reducing its electro-negative potential. The alloy defined in claim 1 of the main request was, therefore, not a novel selection from D1a.

Likewise, D9-2 disclosed an aluminium alloy composition overlapping that of claim 1 of the first to third auxiliary requests. In particular sample F of D9-2 came close the claimed ranges and disclosed an In-, Sn-, Zr- and Cr-free alloy. Also for the claims according to the first to third auxiliary requests, the novelty of a selection invention was not given.

Although novelty could not disputed for the point-like compositions of the aluminium alloy featuring in claim 1 of the fourth auxiliary, the compositions, selected with respect to the desired properties, were obvious for a person skilled in the field of aluminium alloys since the effect of the alloying elements on the final properties of an Al alloy was amply described in the prior art, e.g. in D1a and D14-2, and therefore well known to the expert. The subject matter of claim 1 of

the fourth auxiliary request therefore lacked an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. As to the number of opponents, the act dated 30 April 2004 establishes that the opposition was filed together by the companies PECHINEY RHENALU and PECHINEY. Thus, the quality of opponent belongs to both of them. Following the change of name registered by the EPO, the companies are called ALCAN RHENALU and ALCAN FRANCE SAS, respectively. ALCAN France is thus allowed to submit arguments to the Board.

3. Having carefully considered the relevance of the documents submitted by the respondent, the Board informed the parties in its communication that, apart from D1a, documents D9-2 and D14-b were considered highly relevant, and therefore these documents were admitted to the appeal proceedings.

4. Amendments to the claims of the main and first to fourth auxiliary requests; Article 123(2) EPC

Claim 1 of the main request results from a combination of claims 1 and 4 as granted. Since in claim 1 as granted In, Sn, Cr and Sn+V are merely optional components which can be totally absent, the deletion of these elements from the alloy composition set out in claim 1 of the first to fourth request is admissible.

The restrictions of the ranges for Si (0.7 to 1.2%) and manganese (0.8 to 1.1%) featuring in claim 1 of the second and third auxiliary requests have a basis in paragraphs [0014] and [0015] of the specification and in claim 2 as granted, and are also admissible.

The composition of the fin stock material set out in claim 1 of the fourth auxiliary request is supported by the examples 5 and 6 given in Table 1 of the patent specification.

Hence, there are no formal objections to the amended claims according to any request under Article 123(2) EPC. Besides, the opponent did not object to these amendments at the oral proceedings.

5. Main request

5.1 As defined in claim 1, the patent at issue relates to the composition of an aluminium alloy for producing heat exchanger fins which exhibits an improved post-braze strength in combination with a good corrosion resistance and is designed to have an improved tolerance for undesired impurity elements (see [0007], [0008]). The patent specification further emphasizes in paragraph [0012] that the key feature of the claimed alloy resides in a relatively high Si-content in combination with a medium Mn content, thus achieving an increased post-braze strength of more than 15% as compared to conventional fin stock material, such as AA3003.

Likewise, document D1a discloses the composition of an aluminium alloy suitable as a fin material in heat

exchanger devices. After brazing the fin material serves, due to its electrochemical potential, as a sacrificial anode against corrosion of the heat exchanger, and exhibits a high thermal conductivity as well as a good post-brazed strength (see D1a, page 1, first paragraph 1; page 2, point 3: first paragraph; page 11, fourth paragraph). In its broadest form, the known Al-alloy comprises,
0.1 to 1.0% Si, 0.1 to 1.5% Mn, 0.05 to 0.7% Mg, 0.1 to 1.8% Fe,
at least one element selected from the group of: less than 2.0% Zn, less than 0.25% Cr,
at least one element selected from the group of 0.005 to 0.1% In, 0.01 to 0.1% Sn and 0.01 to 0.25% Ga,
the balance being Al and residual impurities (see page 2, first paragraph).
As mentioned on page 8, second full paragraph, less than 0.3% Cu and less than 0.1% Ti are also tolerated.
Among the 33 examples D1a disclosed in Table 1, particular reference is made to examples 11 and 15, comprising 0.80% Si, 0.80% Mn, 0.21% Mg, 0.30% Fe, 0.3% Zn, 0.045% In, balance Al and composed of 0.80% Si, 0.80% Mn, 0.21% Mg, 0.30% Fe, 0.6% Zn, 0.027% In, 0.10% Zr, 0.09% Cr, balance Al, respectively.

When applying the criteria for the novelty of a selection invention, as described in the "Case Law of the Boards of Appeal, 5th Edition 2006, chapter I.C.4.2, it has to be examined whether the selected sub-ranges of the alloy claimed in the patent are narrow (criterion (i)), sufficiently for removed from the preferred part of the known range, illustrated for instance by examples 11 and 15 of D1a (criterion (ii)), and represent a "purposive selection" rather than a

mere embodiment of the prior art (criterion (iii)). All three criteria have to be met.

For (i), the overlapping range of 0.7-1.0% Si represents 33% of the extent of the range of 0.1-1.0% Si of D1a, and for Mn, the overlap range of 0.7-1.2% is still 36% of that of 0.1-1.4% Mn of D1a. For Mg and Zn, the degree of overlap is 28% and 90%, respectively, and for the claimed 0.2-0.4% Cu, the overlap with 0 to 0.3% Cu of D1a is 33%. Considered in their entirety, the claimed ranges thus could be rated as being relatively narrow as compared to D1a.

For (ii) it is noted that the examples 11 and 15 do not comprise copper, but all the remaining components fall within the elemental ranges set out in claim 1 of the main request. Despite its adverse effect of rendering the alloy less electronegative and, in consequence thereof, changing the alloy's corrosion properties when exceeding certain limits, copper is nevertheless tolerated up to less than 0.30% in the known alloy, as set out in D1a, page 8, second full paragraph. This part of document D1a relates to the alloy compositions discussed therein in general and is not restricted to the embodiment (3) on page 4, first full paragraph of D1a, as alleged by the respondent. It is important to note that this maximum level of 0.30% of D1a complies with the amounts of 0.30 and 0.25% Cu in the examples 1 to 6 given in Table 1 the claimed alloy. It is therefore concluded from these considerations, that the claimed Al-alloy composition, by the lower limit of 0.2% Cu, is not sufficiently far removed from the copper free examples 11 and 15 of D1a which nevertheless tolerate copper in amounts up to 0.3%

without adversely affecting the alloy's properties. In view of the general technical teaching given in D1a as discussed above, the skilled metallurgist would, therefore, seriously contemplate working in the area of overlap.

Since, apart from 0.25 to 0.30% Cu, the composition of examples 11 and 15 corresponds to the claimed alloy, in particular as regards the compulsory (or key-) elements Si, Mn, Mg and Zn, the profile of the mechanical and chemical properties of the known alloy is expected to be the same or, put the other way, no specific effect resulting from the claimed composition can be identified justifying a "purposive selection" (criterion iii).

As all three criteria for the novelty of a selection must be fulfilled, the fact that neither criterion (ii) nor (iii) is satisfied leads to the conclusion that the subject matter of claim 1 of the main request lacks novelty over the disclosure of D1a.

6. Second to third auxiliary requests

6.1 In addition to D1a, also document D9-2 discloses the manufacture of Al-alloy fin material for heat exchangers that is excellent in strength and high temperature buckling resistance (see D9-2, page 1, abstract; claim 2). The alloy comprises:
0.01 to 1.5% Si, 0.01 to 2.0% Mn, 0.05 to 1.0% Mg, 0.01 to 1.0% Fe, 0.04 to 5.0% Ni, 0.05 to 0.3% Cu,
one or more primary elements of the group consisting of 0.001% to 0.5% Cr, 0.001 to 0.5 Zr, 0.001 to 1.5% Hf, 0.001 to 0.5 Ti and 0.0001 to 0.1% B,

one or more secondary elements of the group consisting of 0.5 to 5.0% Zn, 0.005 to 0.5% In, 0.003 to 0.5% Sn, the balance Al and residual elements (see Abstract; claim 2).

Sample F, as one preferred embodiment of this alloy given in Table 2, includes 0.75% Si, 1.22% Mn, 0.22% Mg, 0.34% Fe, 1.03% Zn, 0.77% Ni, 0.12% Cu, 0.02% Ti, 0.003% B, the balance being Al.

6.2 The Board notes that the composition of sample F satisfies the elemental ranges set out in claim 1 of the first auxiliary request, with the exception of 0.12% Cu that falls slightly outside the claimed range of 0.2 to 0.4 Cu. Contrary to the appellant's position, 0.12% Cu is rated as being close to the lower limit of 0.2% Cu of claimed alloy. Even if the claimed composition could be regarded as being "narrow" compared with the broad ranges set out in D9-2, the preferred part of D9-2 illustrated by example F is not sufficiently far removed from the Cu-range claimed in the patent. Hence at least criterion (ii) for the novelty of a selection is not satisfied. The presence of 30 ppm boron in sample F is rated as one of the "impurity elements" which could be tolerated in the claimed alloy in amounts up to 0.05% and therefore does not bring about a patentable distinction. Hence, the subject matter of claim 1 of the first auxiliary request lacks novelty with respect to the disclosure of D9-2.

6.3 The same finding is true for the Al-alloy compositions stipulated in claim 1 of the second and third auxiliary requests, wherein the upper limit for Mn has been

restricted to 1.1% (2nd and 3rd auxiliary request) and that for Zn to 1.0% (3rd auxiliary request). In the Board's assessment, the Mn-content of 1.22% of sample F still comes close to the claimed upper limit of 1.1% Mn, and the values of 1.0 and 1.03% Zn are identical within the accuracy of chemical analysis. In view of these considerations, the subject matter of claim 1 of the second and third auxiliary request is not novel either.

7. Fourth auxiliary request

None of the cited documents discloses the two singular aluminium alloy compositions featured in claim 1 of the fourth auxiliary request. In contrast thereto, the alloys of D1a include at least one of In, Sn or Ga whereas alloy F of D9-2 comprises Si-amounts lower than claimed, only 0.02% Ti and the additional amount of 0.77% Ni. The alloy composition disclosed in D14-2 includes Ca as a compulsory element, and all examples comprise Cr, Zr and In (except for In-free example 36). Hence, the subject matter of claim 1 is novel vis-à-vis the technical disclosure of documents D1a, D9-2 and D14-2. At the oral proceedings novelty was not disputed (any more) by the respondent.

Turning to inventive step, the Board cannot identify any pointer or hint in the discussed prior art for specifically designing the two claimed point-like compositions. The respondent correctly pointed out that the effects of the individual components such as Si, Mn, Mg, Ti, Zn etc on the physical and chemical properties of an aluminium alloy are described in detail in D1a and D14-2 and are therefore generally known to the metallurgical expert. The respondent's conclusion that

the claimed alloy compositions are an obvious choice for a skilled person could, however, not be followed. Nothing is found in these documents that would prompt a skilled person in an obvious way to design specifically the Al-alloy compositions now claimed, when he faces the problem of improving the overall performance of an alloy for heat exchanger fins, in particular its mechanical properties and reduced corrosion attack on the fins after brazing, its fine grained structure and improved tolerance for impurities which are generally introduced when melting scrap. On the basis of the cited documents an inventive step of the claimed subject matter therefore cannot be disputed.

Claim 2 relates to a preferred embodiment of the fin stock material defined in claim 1.

The brazed heat exchanger set out in claim 3 comprises fins of the new and inventive alloy according to claim 1.

Consequently, claims 2 and 3 are also 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 on the basis of claims 1 to 3 of the fourth auxiliary request filed at the oral proceedings and a description to be adapted to these claims.

The Registrar: The Chairman:

V. Commare T. Kriner