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D E C I S I O N
of 3 February 2005

Case Number: T 0609/03 - 3.2.7

Application Number: 95926967.1

Publication Number: 0772698

IPC: C23C 14/14

Language of the proceedings: EN

Title of invention:
Selected processing for non-equilibrium light alloys and products

Applicant:
Hehmann, Franz, Dr

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 83, 84
EPC R. 67, 89

Keyword:
"Insufficiency (main and auxiliary requests I to III - no)"
"Claims - lack of support (auxiliary request IV - no)"
"Reimbursement of appeal fee (no)"

Decisions cited:
T 0843/91

Catchword:
-

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Case Number: T 0609/03 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 3 February 2005

Appellant: Hehmann, Franz Dr.
Iburger Strasse 151
D-49082 Osnabrück (DE)

Representative: -

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 15 November 2002 refusing European application No. 95926967.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. A. O'Reilly
Members: H. E. Hahn
E. Lachacinski

Summary of Facts and Submissions

I. The applicant lodged an appeal against the decision of the Examining Division to refuse the European patent application No. 95 926 967.1.

The Examining Division held that claim 1 of the main request as submitted on 27 March 2000 and claim 1 of the auxiliary request dated 31 May 2002 did not meet the requirements of any of Article 83, 84 or 54 EPC.

II. With a communication dated 20 October 2004 annexed to the summons for oral proceedings the Board presented its provisional opinion that the subject-matter of claim 1 of 27 March 2000 (main request), claim 1 of 31 May 2002 (auxiliary request I), claim 1 of version B of Annex 2 of 24 March 2003 (auxiliary request II) and claim 1 of Annex III of 24 March 2003 (auxiliary request III) appeared to contravene Article 84 EPC and Article 123(2) EPC. Moreover, it appeared that claims 1 of the main and auxiliary requests I and II did not meet the requirements of Article 83 EPC. Furthermore, the subject-matter of claims 1 of the main and auxiliary request I appeared to lack novelty with respect to the magnesium alloys obtained by either vapour deposition or rapid solidification processes according to the documents D1 and D2 or D8 and D13, respectively. With respect to a requested reimbursement of the appeal fee it appeared that none of the requirements of Rule 67 EPC was fulfilled. It was further remarked that, provided that one of the requests would meet the requirements of Articles 54, 83, 84 and 123(2) EPC, the Board intended to remit the case to the first instance for further prosecution.

III. The most relevant documents of the prior art submitted were considered to be:

D1 = GB-A-2 262 539

D2 = ANNUAL REPORT AD-A 253 923 OFFICE OF NAVAL RESEARCH, June 1992, ARLINGTON VA/USA pages 23 - 32 SHAW ET AL. 'Inhibiting corrosion in Gr/Al and Gr/Mg metal matrix composites using non-equilibrium alloying techniques'

D8 = H. JONES and F. HEHMANN in: 'Rapidly solidified alloys and their mechanical and magnetic properties', 1986, MATERIALS RESEARCH SOCIETY, PITTSBURG, PA, ED GIESSEN, POLK AND TAUB

D13 = Rapidly Solidified Alloys, Howard H. Liebermann, Marcel Dekker, Inc., New York Basel Hong Kong, 1993, pages 1-10, pages 339-347 and pages 373-377

IV. Oral proceedings before the Board of Appeal were held on 3 February 2005.

(i) The appellant requested that the decision be set aside and a patent be granted on the basis of claim 1 according to the main request as filed during the oral proceedings on 3 February 2005, or on the basis of claim 1 according to the auxiliary requests I to III as stated in the grounds of appeal dated 24 March 2003, or on the basis of claim 1 according to auxiliary request IV as filed during the oral proceedings on 3 February 2005.

V. Claim 1 of the main request as submitted during the oral proceedings on 3 February 2005 reads as follows:

"1. A magnesium-based alloy comprising an alloy matrix of at least one solid solution or amorphous phase, said magnesium-based alloy having **a porosity-free microstructure** which comprises **a homogeneous distribution** of at least one solute atom of at least one alloying element or alloying of at least 0.1 % by atoms or weight and a majority of atoms in contact with impurity atoms being solvent magnesium atoms, wherein said impurity atoms are selected from at least one impurity or trace element of the group of Fe, Ni, Cu, Na and K,

said porosity-free microstructure is obtained by an alloy synthesis and by an alloy conversion, wherein said alloy synthesis comprises making a synthesized material selected from the group consisting of:

A. a vapour deposited alloy comprising (i) a columnar grain structure without boundary phases made without using ions on a substrate chilled by a chill medium and (ii) porosity during vapour impingement, wherein said vapour deposited alloy is consolidated in-situ in-vacuum after deposition of a non-consolidated layer prior to exposure to vapour impingement on a successive deposition pass.

B. a mechanically alloyed powder comprising a homogeneous one-phase or essentially one-phase non-equilibrium structure obtained by a controlled deformation energy by shock from normal velocity and by a controlled friction from tangential velocity of at least one milling projectile, said mechanically alloyed powder handled in an inert atmosphere before said alloy conversion,

C. a rapidly solidified alloy comprising a planar or partitionless growth without a segregation from a cellular growth or from a dendritic growth sustained by a heat transfer comparable to a wheel speed ranging from 3.5 to 7.0 km/min and afforded by a wheel of a highly conductive material under an helium atmosphere and by melting using commercially pure feedstock and an inert crucible material,

D. a cast product from casting under an inert atmosphere after melting using commercially pure feedstock and an inert crucible material, said cast product being without microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content by weight of 0.0005% Ni, 0.0013% Fe and <0.0005% Cu and no level of Na above 0.003 wt.%,

E. an ingot cast product from an ingot casting under an inert atmosphere after melting using commercially pure feedstock and an inert crucible material, said ingot cast product being without microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content by weight of 0.0005% Ni, 0.0013% Fe and <0.0005% Cu and no level of Na above 0.003 wt.%, and

F. a micrograined alloy from a spray deposition under an inert atmosphere after melting using commercially pure feedstock and an inert crucible material, said micrograined alloy being without microalloyed constituents on grain boundaries and

having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content by weight of 0.0005% Ni, 0.0013% Fe and <0.0005% Cu and no level of Na above 0.003 wt.% and an impurity inclusion,
wherein said synthesized material comprises one or more of the following:

- a grain size < 8 µm,
- another slip mode induced by alloying,

wherein said synthesized material is employed for said alloy conversion, wherein said alloy conversion is carried out at a temperature being not as elevated as to trigger disintegration of an atomic homogeneity of said synthesized material by employing one or more of the following:

- consolidating said synthesized material at a consolidation temperature ≥ 15°C.
- heat treating a resulting consolidated alloy before, after or before and after said consolidating.
- a solid state quenching after said heat treating."

VI. Claim 1 of auxiliary request I as filed on 31 May 2002 with letter of 31 May 2002 (identical with the single auxiliary request considered by the Examining Division) reads as follows:

"1. A magnesium-based alloy comprising at least one alloying element or alloying addition in a solid solution or amorphous phase, said magnesium-based alloy having **a porosity-free microstructure** which comprises **a homogeneous distribution** of at least one solute atom of at least one alloying element or alloying addition,

wherein said porosity-free microstructure is obtained by a consolidation of a material selected from the group consisting of:

A. a vapour deposited alloy comprising a columnar grain structure without boundary phases on a substrate chilled by a chill medium,

B. a mechanically alloyed powder comprising a homogeneous one-phase or essentially one-phase non-equilibrium structure without an undissolved constituent in a crystalline or amorphous solid solution and a deformation energy mechanically controlled by shock,

C. a rapidly solidified alloy comprising a planar or partitionless growth without a segregation from a cellular growth or from a dendritic growth sustained by a heat transfer comparable to a wheel speed ranging from 3.5 to 7.0 km/mm and afforded by a wheel of a highly conductive material under an helium atmosphere,

D. a casting into a cast product without microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu,

E. an ingot casting into an ingot cast product without microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu,

F. a spray deposition to produce a micrograined alloy without microalloyed constituents on grain

boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu and an inclusion, and

G. a splat cooling process using a pressure of 0.125 bar/ (mm^2 splat surface) to pneumatically accelerate at least one substrate against a molten droplet of said alloy and having a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu."

VII. Claim 1 of auxiliary request II as filed with the grounds of appeal dated 24 March 2003 (version B of Annex II submitted with same letter) reads as follows:

"1. A magnesium-based alloy comprising at least one alloying element or alloying addition in a solid solution or amorphous phase, said solid solution or amorphous phase having **a porosity-free microstructure** which comprises **a homogeneous distribution** of at least one solute atom of at least one alloying element or alloying addition,
wherein said porosity-free microstructure is obtained by a consolidation at a temperature at or above 15°C of a precursor material comprising grains, cells or subcells, wherein said grains, cells or subcells have one or more dimensions < 10 µm, wherein said precursor material is selected from the group consisting of:

A. a vapour deposited alloy comprising a columnar grain structure without boundary phases on a substrate chilled by a chill medium, wherein said vapour deposited alloy was obtained by an in-situ

consolidation in a vacuum of said vapour deposited alloy on said substrate,

B. a mechanically alloyed powder comprising a homogeneous one-phase or essentially one-phase non-equilibrium structure without an undissolved constituent in a crystalline or amorphous solid solution and a deformation energy mechanically controlled by shock,

C. a rapidly solidified alloy comprising a planar or partitionless growth without a segregation from a cellular growth or from a dendritic growth sustained by a heat transfer comparable to a wheel speed ranging from 3.5 to 7.0 km/mm and afforded by a wheel of a highly conductive material under an helium atmosphere,

D. a cast product from a casting process and without having microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu, wherein said cast product was consolidated by a pressure die-casting into a wall thickness ranging from 0.2 to 20 mm and subjected to a solid solution heat treatment,

E. an ingot cast product from an ingot casting process and without microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu, wherein said ingot cast product was

consolidated by an extrusion into a bar or rod or by a fabrication into a forging, a sheet, a plate or a foil and subjected to a solid solution heat treatment before or after or before and after said extrusion or before or after or before and after said fabrication, and

F. a micrograined alloy from a spray deposition process and without having microalloyed constituents on grain boundaries and having a concentration of the at least one alloying element or alloying addition within an equilibrium solid solubility range of close-packed-hexagonal magnesium and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu and an inclusion, wherein said micrograined alloy was consolidated by an extrusion into a bar or rod or by a fabrication into a forging, a sheet, a plate or a foil and subjected to a solid solution heat treatment before or after or before and after said extrusion or before or after or before and after said fabrication."

VIII. Claim 1 of auxiliary request III as filed with the grounds of appeal dated 24 March 2003 reads as follows:

"1. A magnesium-based alloy made by a chill-block casting technique, said magnesium-based alloy comprising **a porosity-free microstructure** and at least one alloying element or alloying addition in a solid solution and said chill-block casting technique being selected from the group consisting of continuous chill block casting, thin-strip casting, twin-roller quenching, thin-wall casting, pressure die casting to a wall thickness <20 mm, planar flow casting and melt spinning, wherein said porosity-free microstructure comprises in an as-solidified state or after an alloy

conversion selected from the group consisting of one or more of the following:

- a thermo-mechanical treatment or rolling or superplastic forming,
- a hot forming operation or hot pressing,
- a forging or an extrusion,
- a communition to flakes or powder and a forging or an extrusion,
- a cold pressing or a cold isostatic pressing,
- a solution or homogenisation heat treatment,
- a thermo-mechanical treatment or a hot forming operation at temperatures according to a solution heat treatment,
- a quenching of a resulting product form, and
- an annealing treatment

a homogeneous distribution of at least one solute atom of the at least one alloying element or alloying addition and a maximum content of critical impurities by weight of 0.0005% Ni, 0.0013% Fe and 0.0005% Cu and no corrosion-rate controlling Fe inclusion."

IX. Claim 1 of auxiliary request IV as filed during the oral proceedings on 3 February 2005 differs from claim 1 according to the main request in that the feature "**porosity-free**" has been deleted from the third line of the claim and that the feature "which comprises **a homogenous distribution** of at least one solute atom of at least one alloying element or alloying of" has been replaced by "without a microsegregation or impurity inclusion, wherein said microstructure comprises". Furthermore, the feature "another slip mode induced by alloying" was replaced by "alternatively: a prismatic slip mode induced by alloying".

X. The appellant argued essentially as follows:

The invention resides in the homogeneous distribution of the alloying elements and impurities in combination with the absence of porosity in the magnesium alloys. The term "homogenous distribution" of claim 1 of the main request is clear and means that the same distribution of alloying elements (but also of the impurities, etc.) is present throughout the entire magnesium alloy. When an impurity atom is considered as a solute it is the same as with the alloying elements. The "homogenous distribution" of the alloying elements and of the impurities in the magnesium alloys was a theoretical exercise. The state of the art discloses only magnesium microstructures having corings and pips but has never reported such a "homogenous distribution". Although known processes are used in the routes A to F of claim 1 the state of the art does not really disclose the link between the known processes and the new magnesium alloys. Corresponding features such as the in-situ consolidation of the vapour deposited alloy as specified in route A or the use of commercially pure feedstock and an inert crucible material have been incorporated in routes C to F, respectively, and further process features and properties of the magnesium alloy were added to claim 1. Thus the skilled person has all the information necessary to produce the claimed alloys having the desired properties. The vapour deposited alloys of route A may have excellent properties but this has not yet been proven.

Claim 1 of auxiliary request IV differs from claim 1 according to the main request in that the objected

terms "homogenous distribution" and "porosity-free" have either been deleted or replaced by the definition "without a microsegregation or impurity inclusion, wherein said microstructure comprises". Additionally, the feature "another slip mode induced by alloying" was replaced by "alternatively: a prismatic slip mode induced by alloying". Thereby the objections raised under Article 83 EPC should be overcome.

XI. After the chairman of the Board had announced the decision to dismiss the appeal the oral proceedings were closed. Thereafter, in the very late evening of 3 February 2005 the appellant submitted a fax to the Board asking for a continuation of the proceedings.

XII. With letter of 7 February 2005 the appellant requested to enlarge the Board of Appeal and submitted a new main request containing an amended claim 1.

Reasons for the Decision

1. *Sufficiency of disclosure (Article 83 EPC)*

Main request

1.1 The discussion during the oral proceedings before the Board concentrated on the issue of Article 83 EPC without consideration of any other requirements of the EPC such as Articles 84 and 123(2) EPC since this issue was considered to be the most difficult. The discussion concentrated on the two features of "**a homogenous distribution** of at least one solute atom of at least one alloying element or alloying (should correctly read

"or alloying addition")" and "a **porosity-free** microstructure" of claim 1 of the main request.

1.2 As explained by the appellant the term "a **homogenous distribution** of at least one solute atom of at least one alloying element or alloying" of claim 1 of the main request is intended to define a distribution of the said alloying elements or alloying additions, of the solutes and of the inevitable impurities which should be the same over any length (down to the atomic length scale) of the entire magnesium alloy. Based on their concentration there should be a specific distance between two alike atoms of the at least one solute atom of the alloying elements or alloying additions (or the impurities) which should be identical in all three crystallographic directions of the magnesium alloy. The feature "a **homogenous distribution** of at least one solute atom of at least one alloying element or alloying" of claim 1 of the main request is thus intended to define an ideal which, according to the Board's view, cannot be reached in practice since no one can achieve 100%. There will always be an imperfection in the alloy so that this condition will not be fulfilled.

1.2.1 Furthermore, the application as filed does not disclose any method which would allow verifying whether this condition of claim 1 of the main request is fulfilled, or not. This fact had already been mentioned in the decision of the Examining Division (see reasons of the decision, points A.2.ii and A.2.iii).

With respect to such a missing method the appellant stated during the examination procedure that "an

extensive investigation into the experimental tests to identify the feature of claim 1" had been undertaken with the result that a specific equipment technique ("APFIM-TAP") was necessary to analyze the solute atoms in the solvent magnesium atoms (see letter dated 4 October 2001, page 1 to page 2, second paragraph). In the same letter it was stated that "on 19 July 1995, a characterization method was not available in order to distinguish individual solutes from individual solvents" (see letter dated 4 October 2001, page 2, third paragraph). This statement was retracted in the following procedure and the appellant alleged that TEM and/or APFIM-TAP represent standard methods for determining atomic distances and thereby for verifying said "a **homogeneous distribution**". However, the appellant has not submitted any evidence in this context although he was asked to do so (see communication annexed to the summons dated 20 October 2004, points 3 to 3.1). Thus it has neither been proven that these two methods represent standard methods which are suitable for this purpose nor that they were available before the priority date of the application, i.e. before the 19 July 1995.

The Board therefore concludes that, at the time before the application was filed, the skilled person was not enabled to determine whether a magnesium alloy obtained in accordance with a process of the state of the art such as described in documents D1 and D2 (see page 1, first and second paragraph; page 3, last paragraph to page 4, first and third paragraph; page 6, first and second paragraph; and figure 1; see D2, page 26, table 4-1; page 27, third and fourth paragraph; i.e. vapour deposition processes) or documents D8 and D13

(see D8, tables 1 and 2; see D13, tables 1 to 3; i.e. rapid solidification processes such as melt-spinning in combination with extrusion or the two-piston variant of the piston-and-anvil device) fulfilled this requirement of "a **homogeneous distribution**", or not. Thereby the skilled person was not enabled to determine whether or not he had carried out the invention defined in claim 1 of the main request.

1.2.2 Furthermore, the appellant admitted that the existence of such "a **homogeneous distribution**" in magnesium alloys was only the result of a theoretical approach made. For example, it was deduced from the featureless chill zone resulting from the piston-and-anvil splat cooling process (which used a pressure of 5 bars to pneumatically accelerate the moving piston) that the resulting magnesium alloys should have this "**homogeneous distribution**" (compare page 6, line 14 to page 7, line 5). The Board remarks, however, that it has not been verified that any of the magnesium alloy samples obtained by one of the experiments described in the application had that property of a "**homogeneous distribution**".

1.2.3 The appellant further argued that this "**homogeneous distribution**" would be the automatic result of the applied process routes A to F as specified in claim 1 of the main request. Although known processes are used in the routes A to F of claim 1 the state of the art does not in fact disclose the link between the known processes and the new magnesium alloys.

1.2.4 These arguments cannot be accepted by the Board for the following reasons.

On the one hand the appellant argued that the microstructures of magnesium alloys obtained by the processes of the prior art such as the rapid solidification processes described in documents D8 or D13 or the vapour deposition processes of documents D1 and D2 do not result in said "**homogeneous distribution**". If these arguments were accepted then this would imply that the magnesium alloys obtained by the known processes according to these documents have a heterogeneous distribution which has to be transformed somehow into said "**homogeneous distribution**".

On the other hand the definition of the material according to route C of claim 1 of the main request comprises only features which are common in the rapid solidification field. The appellant alleged that the use of helium as the inert gas during a rapid solidification process in combination with the use of commercially pure feedstock and an inert crucible material as defined in route C causes said "**homogeneous distribution**". This does not appear to be credible for the Board because the specification as filed generally allowed the use of inert gas, particularly argon and/or nitrogen during the melting operation of the rapid solidification processes (see claims 3.1 and 3.16 as filed), or particularly helium or a mixture of helium with other suitable and inert gases (see claim 9 as filed) and because the latter two features represent standard measures for the skilled person. Furthermore, no evidence was submitted which would have supported this allegation.

Similarly, it is not apparent from the specification that the features "and porosity during vapour impingement, wherein said vapour deposited alloy is consolidated in-situ in-vacuum after deposition of a non-consolidated layer prior to exposure to vapour impingement on a successive deposition pass", which were added to the vapour deposition route A of claim 1 of the main request, result in a transformation of a "heterogeneous distribution" into a "**homogeneous distribution**". Particularly, the quoted passages of the description from which these features were taken (i.e. page 171, first paragraph; page 172, line 8; as-filed claims 1.8 and 7.24; figure 101) are silent with respect to such a transformation. The Board also remarks that the specification does not reveal a single example which would have been made in accordance with this technique of route A and where it has been verified that this treatment results in said "**homogeneous distribution**".

1.2.5 Taking account of points 1.2.3 and 1.2.4 above the Board comes to the conclusion either that the magnesium alloys obtained by the rapid solidification processes according to the prior art must have had said "**homogeneous distribution**" of claim 1 of the main request, which was denied by the appellant, or that the specification of this application does not disclose all the process steps and parameters which are necessary to arrive at a product having said "**homogeneous distribution**".

1.3 With respect to the other crucial feature "a **porosity-free** microstructure" the Board makes the following remarks.

1.3.1 During the proceedings the appellant interpreted the term "porosity" as a population of individual pores excluding "homogeneous sites", "vacancies", "dislocations", "stacking faults" and "grain and interphase boundaries" (see submission dated 2 February 2005, page 3, paragraph 4) whereas originally it was defined by him as "missing matter on an atomic length scale so deteriorating the quoted atomic homogeneity and resulting benefits of what is usually considered to be a "one-phase" alloy (matrix) starting from a double-vacancy (see the value of 0.001 µm or 10 Angström in claim 1.27 as-filed, i.e. twice the translational distance along the "c"-axis of the cph-Mg-crystal) and corresponding to a cluster of two atoms (like anti-matter to matter) in space" (see letter dated 27 June 1998, commentary to new sets of claims, page 2, last paragraph to page 3, first paragraph).

1.3.2 The appellant argued similarly as for the first feature that the "**porosity-free** microstructure" would be the automatic result of the applied process routes A to F as specified in claim 1 of the main request.

As remarked in the communication of the Board annexed to the summons (see point 2.1) tests for measuring the porosity of the magnesium alloy samples obtained by the experiments described in the application have not been made. As stated by the appellant this property has also only been deduced from the process parameters of the used piston-and-anvil method (particularly a pressure of 5 bars) and the microscopic inspection at a magnification of 500x (see page 6, last paragraph to page 7, first paragraph and figures 8-10). Such a

magnification, however, does not allow to determine that there exist no pores at all, and specifically to detect pores in the range of nanometres, e.g. 5 nm. The Board therefore concludes that it has not been verified that any of the magnesium alloy samples obtained by one of the experiments described in the application had this property of "a **porosity-free** microstructure".

1.3.3 Furthermore, even if a consolidation step reduces the porosity of as-deposited magnesium alloys it is not credible that all pores, i.e. effectively 100%, are removed by such a treatment as admitted by the appellant. Thus the Board considers that the feature of "a **porosity-free** microstructure" represents an ideal for an alloy property for the person skilled in the art in the field of metallurgy.

1.4 The Board therefore concludes that the features "a **homogeneous distribution**" and "a **porosity-free** microstructure" of claim 1 of the main request only define a desired result but the application does not teach as to how to obtain this desired result. It is thus considered that the application does not disclose the invention of claim 1 of the main request in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art.

Consequently, the main request does not meet the requirements of Article 83 EPC and is thus not allowable.

Auxiliary requests I to III

1.5 The claims 1 of auxiliary requests I to III comprise the identical features of claim 1 of the main request "a **porosity-free** microstructure" and "a **homogeneous distribution** of at least one solute atom of at least one alloying element or alloying addition".

Consequently, the finding of the Board with respect to claim 1 of the main request applies *mutatis mutandis* to the claims 1 of auxiliary requests I to III.

Thus, also the auxiliary requests I to III do not meet the requirement of Article 83 EPC. The auxiliary requests I to III are therefore not allowable.

2. *Clarity (Article 84 EPC)*

Auxiliary request IV

2.1 Claim 1 of auxiliary request IV differs from claim 1 of the main request in that the feature "**porosity-free**" has been deleted and that the feature "which comprises **a homogeneous distribution** of at least one solute atom of at least one alloying element or alloying of" has been replaced by the feature "without a microsegregation or impurity inclusion, wherein said microstructure comprises" and in that the feature "another slip mode induced by alloying" was replaced by "alternatively: a prismatic slip mode induced by alloying".

2.2 It is clear from the application as filed that the feature of "a **homogeneous distribution**" represents an essential feature of the claimed subject-matter (see e.g. page 1, first paragraph; page 50, third paragraph; or page 51, second paragraph, last three lines).

This view was additionally supported by a statement made by the appellant with respect to the main request that the invention resides in the homogeneous distribution of the alloying elements and impurities in combination with the absence of porosity in the magnesium alloys.

The proposed replacement feature of claim 1 of auxiliary request IV "without a microsegregation or impurity inclusion" - which is interpreted as implying that the concentration of the alloying elements or impurities is about the same at the grain boundaries of the magnesium alloys - does, however, not imply that a homogeneous distribution of these alloying elements or impurities must be present in the microstructure of the magnesium alloys.

Consequently, this essential feature of "a **homogeneous distribution**" can neither be removed from claim 1 of auxiliary request IV nor be replaced by the proposed amendment without contravening Article 84 EPC since in each case the claim lacks support in the description.

Claim 1 of auxiliary request IV thus does not meet the requirement of Article 84 EPC. Auxiliary request IV is therefore not allowable.

Formal issues

3. *Request for reimbursement of the appeal fee*

The appellant's request for reimbursement of the appeal fee must be rejected for the following reasons:

According to Rule 67 EPC the conditions to be fulfilled for a reimbursement of the appeal fee are that the Board deems the appeal to be allowable and that the reimbursement is equitable by reason of a substantial procedural violation.

As derivable from the points 1 to 2 above, none of the requests to grant a patent is admissible. Consequently, the first requirement of Rule 67 EPC is not fulfilled.

Furthermore, the Board cannot see that any procedural violation took place during the examination procedure. Thus also the second condition of Rule 67 is not fulfilled.

Consequently, the request for reimbursement of the appeal fee is rejected.

4. *Further requests for continuation of the proceedings and to enlarge the Board of Appeal*

4.1 After the Board had announced its decision and closed the oral proceedings the appellant submitted in the late evening of 3 February 2005 a letter by fax. Therein it was stated that the decision of the Board appeared to be the result of the change in the composition of the Board on 27 January 2005 which had

been only very recently before the date of the oral proceedings and that there was hence not enough time. Therefore, the appellant asked for a continuation of the proceedings in writing and to fix another date to continue the oral proceedings.

4.2 With another subsequently submitted letter dated 7 February 2005 the appellant requested to enlarge the Board of Appeal.

4.3 First of all, the appellant was actually informed on 24 January 2005 by fax (see EPO Form 3022 07.93) that the composition of the Board was changed, namely that the intended chairman was replaced (for being sick). Thereby - only taking account of the fax date - the new chairman had at least eight working days time to prepare for the oral proceedings on 3 February 2005.

Secondly, since the decision had been announced at the end of the oral proceedings before the Board and because the oral proceedings had been closed the appeal procedure was terminated. Thereafter a Board is no longer empowered or competent to take any further action apart from drafting the written decision (also apart from Rule 89 EPC).

4.4 Consequently, any further request of a party filed after the announcement of the decision, such as the appellant's asking for a continuation in writing and to continue oral proceedings, cannot be considered.

This finding is in accordance with the existing jurisprudence of the EPO (cf. "Case Law of the Boards of Appeal of the European Patent Office", 4th Edition 2001, section VII.D.8.3; see decision T 843/91, OJ 1994, 818).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Nachtigall P. O'Reilly