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Datasheet for the decision of 15 July 2014

Case Number: T 0036/12 - 3.2.08

Application Number: 02726582.6

Publication Number: 1366203

IPC: C22C27/02, C23C14/34, C22F1/18

Language of the proceedings: EN

Title of invention:
REFRACTORY METAL PLATES WITH UNIFORM TEXTURE AND METHODS OF MAKING THE SAME

Patent Proprietor:
H. C. Starck, Inc.

Opponent:
CABOT CORPORATION

Headword:

Relevant legal provisions:
EPC Art. 83, 123(2), 114(2)
RPBA Art. 12(4), 13(1)

Keyword:
Main request and auxiliary request 1 (reverting to claims with a scope broader that those considered in the appealed decision - not admitted)
Auxiliary request 2 to 4 (sufficiency of disclosure - no)
Auxiliary requests 5 to 6 (added subject matter - yes)

Decisions cited:
T 0123/85, T 0386/04, T 2075/11

Catchword:

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Case Number: T 0036/12 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 15 July 2014

Appellant: (Patent Proprietor)	H. C. Starck, Inc. 45 Industrial Place Newton, MA 02461 (US)
Representative:	Haggenmüller, Christian Maiwald Patentanwalts GmbH Elisenhof Elisenstraße 3 80335 München (DE)
Appellant : (Opponent)	CABOT CORPORATION Two Seaport Lane, Suite 1300 Boston, Massachusetts 02210-2019 (US)
Representative:	Grünecker, Kinkeldey, Stockmair & Schwanhäusser Leopoldstrasse 4 80802 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 October 2011 concerning maintenance of the European Patent No. 1366203 in amended form.**

Composition of the Board:

Chairman	T. Kriner
Members:	M. Alvazzi Delfrate
	D. T. Keeling

Summary of Facts and Submissions

I. By its interlocutory decision posted on 17 October 2011 the opposition division decided that, account being taken of the amendments made during the opposition proceedings, European patent No. 1 366 203 in the version according to auxiliary request 1 then on file and the invention to which it relates met the requirements of the EPC.

II. Appellant 1 (patent proprietor) lodged an appeal against that decision on 23 December 2011, paying the appeal fee at the same time. The statement of grounds of appeal was filed on 27 February 2012.

Appellant 2 (opponent) lodged an appeal on 22 December 2011, paying the appeal fee at the same time. The statement of grounds of appeal was filed on 27 February 2012.

III. Oral proceedings before the Board of Appeal were held on 15 July 2014.

IV. Appellant 1 requested that the decision under appeal be set aside and the patent be maintained as granted or on the basis of one of the auxiliary requests 1 to 4 all filed with letter of 27 February 2012 or auxiliary request 5 filed with letter of 13 June 2014 or auxiliary request 6 filed at the oral proceedings.

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

V. The independent claims of the patent as granted (**main request**) read as follows:

"1. A refractory metal plate comprising a thickness, a center, and an edge, the metal being selected from the group consisting of tantalum and niobium, said metal being of at least 99.99% purity, the plate having a grain size of less than about 40 microns and a texture that is uniform both through said thickness and from said center to said edge, and further wherein said refractory metal plate has

i) a constant mix of grains with orientation {100} and {111} crystallographic orientations, and

ii) a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across the surface of any plane of said refractory metal plate, said planes being selected from planes that are orthogonal to the thickness of said refractory metal plate, and planes that are diagonal to the thickness of said refractory metal plate, and

iii) a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across any thickness of said refractory metal plate."

"5. A process for producing a refractory metal plate wherein the metal comprises a metal selected from the group consisting of tantalum, alloys of tantalum, niobium, alloys of niobium, said metal being of at least 99.99% purity, with fine metallurgical structure and uniform texture comprising:

a) providing a refractory metal starting piece;

b) first reducing the length of the refractory metal starting piece to form a first workpiece by forging the

billet to a desired billet thickness with about 35% to 50% reduction; [first forging 14]

c) recrystallization annealing the first workpiece at a first temperature of at least 1370°C;

d) second reducing the diameter of the first workpiece (draw back forging) to a diameter substantially the same as a diameter of the refractory metal starting piece to form a second workpiece;

e) recrystallization annealing the second workpiece at a second temperature of at least 875°C;

f) repeating steps b) to e) as necessary to achieve desired grain structure and texture uniformity;

g) third reducing the second workpiece to a first thickness to form a first plate;

h) fourth reducing the first thickness of the first plate by cross rolling to a second thickness to form a second plate; and

i) recrystallization annealing the second plate at a temperature of at least 875°C."

"9. Use of the metal plate prepared by the process of any of claims 5 to 8 as a sputtering target."

Auxiliary request 1 differs from the main request by the deletion of claim 9 and of the terms "alloys of niobium" and "alloys of tantalum" in dependent claims 3 and 8.

Auxiliary request 2 corresponds to the main request underlying the decision under appeal and differs from auxiliary request 1 in that claim 1 and its dependent claims are directed to

"A sputtering target comprising a refractory metal plate ...".

Auxiliary request 3 corresponds to auxiliary request 1 underlying the decision under appeal and differs from auxiliary request 2 in that it is restricted to the method claims.

Claim 1 of **auxiliary request 4** reads as follows (differences in respect of claim 1 of auxiliary request 3 emphasised):

"1. A process for producing a refractory metal plate wherein the metal comprises a metal selected from the group consisting of tantalum, alloys of tantalum, niobium, alloys of niobium, said metal being of at least 99.99% purity, with fine metallurgical structure and uniform texture comprising:

a) providing a refractory metal starting piece of at least 99.99% purity;

b) first reducing the length of the refractory metal starting piece to form a first workpiece by forging the billet to a desired billet thickness with about 35% to 50% reduction; [first forging 14]

c) recrystallization annealing the first workpiece in a vacuum or inert gas at a first temperature of at least 1370°C;

d) second reducing the diameter of the first workpiece (draw back forging) to a diameter substantially the same as a diameter of the refractory metal starting piece to form a second workpiece;

e) recrystallization annealing the second workpiece in a vacuum or inert gas at a second temperature of at least 875°C;

f) repeating steps b) to e) at least one time to achieve desired grain structure and texture uniformity;

g) third reducing the second workpiece to a first thickness to form a first plate;

h) fourth reducing the first thickness of the first plate by cross rolling to a second thickness to form a second plate; and

i) recrystallization annealing the second plate in a vacuum or inert gas at a temperature of at least 875°C."

Claim 1 of **auxiliary request 5** reads as follows:

"1. A process for producing a refractory metal plate wherein the metal comprises a metal selected from the group consisting of tantalum, niobium, said metal being of at least 99.99% purity, with fine metallurgical structure and uniform texture comprising:

a) providing a refractory metal starting piece of at least 99.99% purity;

b) first reducing the length of the refractory metal starting piece to form a first workpiece by forging the

billet to a desired billet thickness with about 35% to 50% reduction; [first forging 14]

c) recrystallization annealing the first workpiece in a vacuum or inert gas at a first temperature of at least 1370°C;

d) second reducing the diameter of the first workpiece (draw back forging) to a diameter substantially the same as a diameter of the refractory metal starting piece to form a second workpiece;

e) recrystallization annealing the second workpiece in a vacuum or inert gas at a second temperature of at least 875°C;

f) repeating steps b) to e) at least one time to achieve desired grain structure and texture uniformity;

g) third reducing the second workpiece to a first thickness to form a first plate;

h) fourth reducing the first thickness of the first plate by cross rolling to a second thickness to form a second plate; and

i) recrystallization annealing the second plate in a vacuum or inert gas at a temperature of at least 875°C."

Claim 1 of **auxiliary request 6** reads as follows:

"1. A process for producing a refractory metal plate wherein the metal consists of tantalum or niobium, said metal being of at least 99.99% purity, with fine metallurgical structure and uniform texture comprising:

a) providing a refractory metal starting piece of at least 99.99% purity;

b) first reducing the length of the refractory metal starting piece to form a first workpiece by forging the billet to a desired billet thickness with about 35% to 50% reduction; [first forging 14]

c) recrystallization annealing the first workpiece in a vacuum or inert gas at a first temperature of at least 1370°C;

d) second reducing the diameter of the first workpiece (draw back forging) to a diameter substantially the same as a diameter of the refractory metal starting piece to form a second workpiece;

e) recrystallization annealing the second workpiece at a second temperature of at least 875°C;

f) repeating steps b) to e) at least one time to achieve desired grain structure and texture uniformity;

g) third reducing the second workpiece to a first thickness to form a first plate;

h) fourth reducing the first thickness of the first plate by cross rolling to a second thickness to form a second plate; and

i) recrystallization annealing the second plate in a vacuum or inert gas at a temperature of at least 875°C."

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

Main request and auxiliary request 1

It was true that the main request underlying the decision under appeal was more restricted than the present main request (patent as granted) and auxiliary request 1. However, as discussed in numerous decisions and in particular in decision T 386/04 withdrawal of subject-matter and defending the patent with a more restricted claim set did not necessarily mean that said subject-matter had been formally abandoned. Hence, the main request and auxiliary request 1 were admissible.

Auxiliary requests 2 to 4

As disclosed in paragraph [0002], the metal plate of the claimed invention was to be used in the production of a thin film for a variety of applications. The person skilled in the art would know, once given the application of the thin film, which elements were to be considered alloying elements and which not. Hence, he would know how to realise alloys of Ta or Nb with a purity of at least 99.99%, as required by the independent method claim of auxiliary requests 2 to 4. Therefore, the invention claimed in these method claims were sufficiently disclosed.

Auxiliary requests 5 and 6

Claim 1 of auxiliary requests 5 and 6 was based on claim 5 of the patent as granted with some minor amendments. Hence, these requests should be admitted into the proceedings.

Moreover, the step recited in the method claims of these requests of first reducing the length of the refractory metal starting piece to form a first workpiece by forging the billet to a desired billet thickness with about 35% to 50% reduction was disclosed in claims 13 and 19 and on page 7 of the application as originally filed. Therefore, auxiliary requests 5 and 6 did not comprise subject-matter which extended beyond the content of the application as filed.

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

Main request and auxiliary request 1

Neither the main request nor auxiliary request 1 was the object of the decision under appeal. Therefore, they should not be admitted into the proceedings.

Auxiliary requests 2 to 4

In auxiliary requests 2 to 4 the independent method claim mentioned alloys of tantalum or niobium of at least 99.99% purity. However, neither the claims, which related to method for the production of a refractory metal plate, nor the description defined on which basis the purity was to be calculated, because they did not specify which elements were alloying elements and which elements were impurities.

Therefore, the patent in suit did not disclose the invention claimed in the independent method claim of each of the auxiliary requests 2 to 4 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Auxiliary requests 5 and 6

Auxiliary requests 5 and 6 were late-filed without a good reason and prima facie not allowable. Hence, they should not be admitted into the proceedings.

In any event, the step of first reducing the length of the refractory metal starting piece to form a first workpiece by forging the billet to a desired billet thickness with about 35% to 50% reduction, comprised in claim 1 of both auxiliary requests 5 and 6, was not disclosed in the application as originally filed. Therefore, these requests did not comply with the requirements of Article 123(2) EPC.

Reasons for the Decision

1. The appeals are admissible.

2. Main request and auxiliary request 1

2.1 The independent claims of the main request presently on file and of the first auxiliary request correspond to the independent claims of the patent as granted. These claims have not been the object of the decision under appeal, since during the opposition proceedings appellant 1 requested to maintain the patent according to the present auxiliary request 2, which has more limited scope.

2.2 Appellant 1 argued that the main request and auxiliary request 1 should nonetheless be admitted into the proceedings on the basis of the reasoning set out in decision T 386/04 of 9 January 2007.

It is true that decision T 386/04 after examining the case law stemming from decision T 123/85 (OJ 1989, 336) states that "It follows that if a patentee, in response to objections made in opposition proceedings, requests that the patent be maintained in limited form, he does not thereby irrevocably surrender the subject matter of the patent as granted which lies outside the request. There is therefore nothing in principle to prevent a patentee from later seeking to amend his request so as to ask for the patent to be maintained in the form as granted (or in more limited terms), either in the course of proceedings before the opposition division or on appeal. Indeed, he is entitled to as of right." (see point 1. of the reasons).

However, decision T 123/85 was taken before the entry into force of Article 12(4) of the Rules of Procedure of the Boards of Appeal (originally Article 10a(4) RPBA, see OJ 2003, 61). Hence, the relevant legislation to be applied in the present case differs from that applicable at the time of the decision in T 123/85 and whether sets of claims presented on appeal are to be considered is not be determined in accordance with the case law established in that decision, but rather in accordance with the procedural rules now applicable to appeal procedures and the specific circumstances of the case (see Case Law of the Boards of Appeal of the European Patent Office, 7h edition 2013, IV.E.4.5.1).

2.3 In particular, Article 12(4) RPBA provides that the board may at its discretion disregard requests which could have been presented in the first instance proceedings.

In the present case it is undisputed that the main request and the auxiliary request 1 could have already

been submitted for decision in the opposition proceedings. Therefore, even accepting that the main request in opposition to maintain the patent in amended form according to present auxiliary request 2 did not imply an irrevocable surrender of the subject matter of the patent as granted which lies outside said request, the admission into the appeal proceedings of the main request and auxiliary request 1 reinstating that subject-matter lies within the discretionary power of the Board.

2.4 It is undisputed that the main request and auxiliary request 1 were not the subject of the decision of the opposition division as result of a deliberate choice of the patent proprietor, who, faced with an objection under Article 123(2) EPC in respect of the patent as granted, amended its main request to comply with the requirements of that provision.

Therefore, admitting these requests and giving a first ruling on them would not only be contrary to the main purpose of the appeal proceedings, which is a review of the decision of the first instance, but also grant appellant 1 the possibility to shift its case as it pleases to the appeal in a kind of forum shopping. As to the possibility of admitting these requests and remitting the case to the opposition division to consider them, it would be unacceptable from the point of view of procedural economy, since it would substantially and unnecessary delay the proceedings (see also T 2075/11 of 23 July 2013, point 2.4 of the Reasons).

Under these circumstances, the Board decided not to admit the main request and auxiliary request 1 into the proceedings.

3. Auxiliary requests 2 to 4

In each of the auxiliary requests 2 to 4 the independent method claim is directed to a process for producing a refractory metal plate wherein the metal comprises a metal selected from the group consisting of tantalum, alloys of tantalum, niobium, alloys of niobium, said metal being of at least 99.99% purity.

However, neither the claims nor the description disclose which elements are to be considered alloying elements and which elements are to be seen as impurities.

Appellant 1 argued that this information can be derived from the intended uses of the thin metal or thin metal oxide film, which is disclosed for instance in paragraph [0002] of the patent in suit. However, claim 1 is not directed to a specific application of thin metal or metal oxide film. As a matter of fact, it does not even concern the production of a thin film but merely a process for producing a refractory metal plate. Hence, the person skilled in the art would not be able to derive which elements are alloying elements and which elements are impurities from the intended use of this refractory plate either.

As a consequence, he would not know on which basis the purity of the Ta or Nb alloy stipulated in the method claim is to be calculated. Therefore, the patent in suit does not disclose the invention claimed in the independent method claim of each of auxiliary requests 2 to 4 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, as

required by Article 83 EPC. Therefore, these auxiliary requests are not allowable.

4. Auxiliary requests 5 and 6

4.1 Auxiliary requests 5 and 6 have been filed respectively one month before the oral proceedings and at the oral proceedings. Hence, they represent amendments to the case of appellant 1 which may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject matter submitted, the current state of the proceedings and the need for procedural economy (Article 13(1) RPBA and Article 114(2) EPC).

Claim 1 of auxiliary requests 5 and 6 is in essence based on claim 5 of the patent as granted with some minor amendments. Therefore, these requests do not introduce new complex subject-matter and can be dealt with by the parties and the Board without substantial delay in the proceedings, so that procedural economy is not affected. Under these circumstances the Board decided to admit auxiliary requests 5 and 6 into the proceedings.

4.2 Claim 1 of both auxiliary requests 5 and 6 comprises the step of first reducing the length of the refractory metal starting piece to form a first workpiece by forging the billet to a desired billet thickness with about 35% to 50% reduction. This first forging step can be understood to comprise a reduction in length ("reducing the length") and a reduction in thickness ("forging the billet to a desired billet thickness").

However, the application as originally filed discloses either a first forging step wherein the length is

reduced, as in claim 13 ("first reducing the length of the refractory metal starting piece to form a first workpiece") and page 7 ("The first forging operation (step 14) reduces each initial workpiece 12 along its longitudinal axis by 35 to 50% to form first forged workpiece 16"), or a first forging step wherein the thickness is reduced, as in claim 19 ("forging the billet to a desired billet thickness with about 35% to 50% reduction"). By contrast, a first forging step wherein both the length and the thickness of the workpiece are reduced, let alone where the length is reduced by reducing the thickness, is not disclosed in the application as originally filed.

Accordingly, claim 1 of each of the auxiliary requests 5 and 6 comprises subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC). Hence, these auxiliary requests are not allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

V. Commare T. Kriner

Decision electronically authenticated