

OPINION UNDER SECTION 74A

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| Patent | GB 2477744B |
| Proprietor(s) | Aeromet International PLC |
| Exclusive Licensee | |
| Requester | Tital GmbH |
| Observer(s) | Aeromet International PLC |
| Date Opinion issued | 1 December 2014 |

The request

1. The comptroller has been requested to issue an opinion as to whether claim 1 of GB 2477744 B (“the patent”) is invalid under section 74A(1)(b) of the Patents Act 1977 by virtue of the lack of novelty or inventive step in light of the documents A1-A4 provided:

A1. PhD Thesis, *Influence of Titanium Diboride (TiB₂) particles on the microstructure and properties of reinforced Al-Si7Mg0.3 and Al-Cu5 MgTi alloys for plaster casting applications*. Pedro Egizabal Luzuriaga, published July 2007.

A2. Book, *Aluminium Alloy Castings Properties, Processes, and Applications*, J.G. Kaufman, ASM International, December 2004.

A3. US 3475166

A4. EP 0940475 A1

Observations

2. Forrester on behalf of Aeromet International PLC (“the proprietor”) filed observations on 3 October 2014. The observations included two documents:
 - i) Page 4 of the Aerospace Material Standard AMS4471A
 - ii) Copies of third party observations filed with the European Patent Office (EPO) on application EP 2534273 on 26 April 2014 and 2 July 2014
 - iii) A declaration by Frederick Feiertag provided for US application

13/578,215. The Proprietor asserts that US application 13/578,215 claim 32 shares the inventive concept of claim 1 of GB 2477744.

Observations in reply

3. In response observations in reply were filed by Kilburn & Strode LLP on behalf of Tital GmbH (“the requester”) on 17 October 2014 citing additional documents A5-6 in order to demonstrate the knowledge of a person skilled in the art at the time of filing the application for GB2477744 (10 February 2010):

A5. Article, “*High strength aerospace aluminium casting alloys: a comparative study*”. T. Din and J. Campbell; Vol.12, Materials Science and Technology, page 644-649; published August 1996.

A6. Article, “*The Effect of Silver content on the precipitation of the Al-4.6Cu-0.3Mg Alloy*”, Chang et al; Vol.46, No 2, Materials Transactions, page 236 to 240; published 2005.

Documents A5 and A6 are stated by the requester to have only been provided to demonstrate the knowledge of a person skilled in the art at the time of filing of the patent and are only referred to in the context of their arguments with regard to novelty. Thus I shall only consider them below if I think it helpful to do so.

Admissibility of the Request

4. The proprietor asserts that the request in relation to documents A1, A2 and A4 should be deemed inadmissible as these documents, with essentially identical arguments, were filed as third party observations at the European Patent Office (EPO) on 2 July 2014 on EP 2534273, the EP equivalent of this patent, and that these documents have therefore been considered pre-grant at the EPO. The Office decisions *Automation Conveyors Limited* (BL O/370/07), *Franks* (BL O/289/07) and *Naylor* (BL O/298/07) all agree that the relevant starting point for considering issues of this kind is section 74A(3)(b) of the Act.
5. Section 74A(3) of the Patents Act 1977 states:

The comptroller shall issue an opinion if requested to do so under subsection (1) above, but shall not do so –
(a) in such circumstances as may be prescribed, or
(b) if for any reason he considers it inappropriate in all the circumstances to do so.

In *Franks* the Hearing Officer stated at paragraph 18:

“It was I believe always the intention that the opinion service would not be used to repeat or in some way reappraise the examination of the patent

performed either in this Office or at the EPO”

6. The requester suggests that the Office decisions are not relevant as they each applied to pre-grant consideration in the same Office, i.e. arguments considered pre-grant at the EPO for an EP patent or arguments considered at the Intellectual Property Office (IPO) for a GB patent, whereas here the arguments were filed on the EP application and it is the validity of the GB patent which is now at issue.
7. It is my view that to accept the requester’s argument would lead me to reappraise the examination performed by the EPO, which is, as discussed in *Franks*, not the purpose of the opinion service. However, whether I am right or wrong on this appears to me moot in view of the discussion below.
8. The requester argues in their observations in reply that *“the third party observations...filed with the EPO were filed after the EPO has already issued a communication under Rule 71(3) EPC (intention to grant). According to the current practice of the EPO, the Examining Division does not consider the third party observations at this stage of the examination procedure.”* The requester points to page 2 of Form 2092C dated 29 July 2014 to demonstrate that no consideration of these documents has occurred stating that *“The Examining Division instructed the Formalities Officer that the third party observations give no cause for amendment of the documents without any substantial argumentation”*.
9. The electronic case file for EP 2534273 shows that the third party observations corresponding with the arguments (in relation to documents A1, A2 and A4) put forward for this opinion were received by the EPO on 2 July 2014. The form 2092C dated 29 July 2014, referred to by the requester, in fact states that the observations giving no cause for amendment were earlier third party observations filed on 26 April 2014. There appears to be no further documentation referring to the later observations, and therefore I draw the conclusion that, despite being on the open part of the case file and having been communicated to the applicant, the third party observations of 2 July 2014 (corresponding with the arguments put forward in this opinion request) were not considered by the EPO. As a result I shall consider this opinion request in its entirety as it relates to arguments that the proprietor was made aware of, but has not previously had put to them.

The Patent

10. The patent was filed on 10 February 2010, and published on 17 August 2011. It was granted on 4 June 2014 and remains in force.
11. The patent relates to aluminium–copper alloys suitable for casting which comprise sufficient free titanium to result in a refined cast grain structure and also comprise substantially insoluble titanium diboride particles which occupy the interdendritic/intergranular regions of the alloy.

Claim 1 reads:

An aluminium-copper alloy for casting, comprising:

| | |
|-----------------------------------|------------------|
| Cu | 3.0 - 6.0wt% |
| Mg | 0.0-1.5wt% |
| Ag | 0.0-1.5wt% |
| Mn | 0.0 - 0.8wt% |
| Fe | 0.0-1.5wt% |
| Si | 0.0-1.5wt% |
| Zn | 0.0 - 4.0wt% |
| Sb | 0.0 - 0.5wt% |
| Zr | 0.0 - 0.5wt% |
| Co | 0.0 - 0.5wt% |
| free titanium | >0.15 to <1.0wt% |
| substantially insoluble particles | 0.5 - 20wt%; and |
| Al and inevitable impurities | Balance, |

wherein the substantially insoluble particles occupy the interdendritic regions of the alloy and comprise titanium diboride particles, and wherein the aluminium-copper alloy comprises greater than 0.15wt% free titanium to result in a refinement of the grain structure in the cast alloy.

The Law

12. Section 1(1) of the Act reads:

A patent may be granted only for an invention in respect of the following conditions are satisfied, that is to say –

- (a) the invention is new;*
- (b) it involves an inventive step...*

Claim construction

13. Before considering the documents put forward in the request I will need to construe the claims of the patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.
14. Neither party has raised any issues in terms of the construction of claim 1. It is however worth noting at this point that, assuming the mantle of the worker skilled in the formulation and production of casting alloys, I have construed the phrasing “*comprising ... and Al and inevitable impurities Balance*” as being exhaustive.

Validity

15. The requester asserts that claim 1 lacks novelty in view of the disclosure of document A1. The proprietor in turn asserts that the disclosure of A1 lacks the necessary feature of “>0.15 to <1.0wt% free titanium” in that the disclosed composition A204R shown at page 54 of the thesis A1 only had 3.4% Ti and 1.7% B and as such all of the Ti would be part of titanium diboride (TiB₂) rather than free:

$$\text{Free titanium (wt\%)} = \text{titanium (wt\%)} - (\text{boron (wt\%)} \times 2.2)$$

$$= 3.4 - (1.7 \times 2.2)$$

$$= -0.34 \text{ (a negative quantity)}$$

16. The requester does not dispute the arithmetic, but argues in their observations in reply that the proprietor has merely cited “isolated parts of document A1. This approach disregards the disclosure of document A1 in its entirety, as set forth in Table 1 of the previously filed Request...”. This argument seems to me in turn to ignore the fact that a novelty destroying disclosure will in general be an isolated part of the prior art. In the context of the chemical arts only what the EPO Boards of Appeal describe as an “individualised description” will be novelty destroying (see for example T 0296/87 HOECHST/*Enantiomers* OJEPO 1990, 195). The disclosed composition of A204R to which they refer is one such individualised description; it however, for the reasons highlighted by the proprietor, does not impugn the novelty of claim 1 of the patent. The general teaching of document A1 will be considered further in relation to the inventiveness of claim 1.
17. In their initial opinion request the requester made the argument that claim 1 of the patent lacked an inventive step as a result of the combinations of document A1 and A2, A2 and A4, and also A3 and A4.
18. In considering these combinations, to determine whether or not the invention defined in claim 1 is inventive over the prior art, I will rely on the principles established in *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588, in which the well known *Windsurfing* steps were reformulated:

(1)(a) Identify the notional “person skilled in the art”;

(1)(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.

19. I consider that the person skilled in the art would be a metallurgist skilled in the art of aluminium casting. The requester asserts that the person skilled in the art’s common general knowledge would include knowledge of the 2XX.X series of aluminium-copper casting alloys and their compositions and “the way that each element affects

the properties of the resulting alloy”. I agree with this to a point, in that the general effect of a particular element would be known, but the interplay of several different elements added to a standard alloy would not be entirely predictable. I will consider below the declaration of Frederick Feiertag provided by the proprietor in relation to the particular documents cited in the request.

20. The proprietor characterises the inventive concept as “*the provision of 0.5-20 wt% substantially insoluble particles which occupy the interdendritic regions of the alloy and comprise titanium diboride particles **and**, further, the addition of free titanium to the alloy to an amount >0.15 to 1.0 wt%*”. As long as it is understood that the “alloy” is an aluminium-copper casting alloy, then I agree with this statement.
21. Starting with A2, the difference between the inventive concept and the disclosure of A2 (Table 2.1 at page 10) is stated by the requester to be that “the insoluble particles should be in the range of 0.5 to 20 wt% ... and that said insoluble particles should occupy interdendritic [regions] of the alloy”. I consider the latter statement to be an inherent feature if the insoluble TiB_2 is present in the appropriate quantities.
22. Document A1 discloses that titanium diboride particles may be used to decrease porosity and solidification shrinkage defects in a 2XX.X series aluminium-copper alloy. However, as already discussed above in relation to novelty there is no disclosure in my view of the use of excess titanium and in addition there is no disclosure or suggestion of the desirability of using extra free Ti. By contrast A2 states that extra titanium (compared with the amount of boron present) is desirable, but this is clearly in the context of grain refinement (see paragraph bridging pages 16 and 17):

“Titanium is extensively used to refine the grain structure of aluminium casting alloys, often in combination with smaller amounts of boron. The operable phase is $TiAl_3$ with lattice spacing closely matched to that of aluminium. Titanium in excess of the stoichiometry of TiB_2 is necessary for effective grain refinement.”

In addition, at page 13 paragraph 1 this same document states in relation to aluminium-copper alloys:

“Alloys of this type are susceptible to solidification cracking and to interdendritic shrinkage. Exacting foundry techniques are required to avoid these conditions. In permanent mold or other rigid mold casting methods, excellent grain refinement and selective chilling are essential.”

23. These statements in my view would lead the skilled worker to conclude that use of TiB_2 in greater amounts than required for grain refinement is desirable in an aluminium-copper alloy and that titanium in excess of that present in TiB_2 is necessary for grain refinement when grain refining quantities of Ti are being used. However, in this instance in A1 the Ti is clearly present in far higher quantities than is necessary for grain refinement, but also is largely, if not entirely, present as insoluble particles. This begs the question, does “*Titanium in excess of the stoichiometry of TiB_2 is necessary for effective grain refinement.*” actually apply in this instance or is it no longer valid? *All the more so as this statement is in direct opposition to that*

present in the declaration of Frederick Feiertag which states that:

“As a person practised in the arts of foundry metallurgy, I would not have simply added free titanium to an aluminium copper melt prior to the present invention, especially a melt of a 205 alloy already containing significant percentage of TiB₂. The addition of free titanium would not significantly increase the strength of the alloy and any such increase could be obtained through other means.”

24. As I am comparing a general statement with no specific reference to insoluble particles and one describing the present inventive concept, I believe that I must place more weight on the latter statement and conclude that the requirement for excess Ti is not valid in this situation. I note the requester's comments in their observations in reply with regard to the declaration being only a personal opinion, but disagree that the statements in it should be disregarded because “any technical prejudice against adding excess titanium seems to have abated, as A2 states that ‘titanium is *often* employed at concentrations greater than those required for grain refinement in order to reduce cracking tendencies...’” as this statement in A2 does not address the situation being considered here (i.e. where large quantities of Ti are present as TiB₂). If this truly represented the orthodoxy that the requester asserts then it might have been expected that the composition (A204R) prepared in A1, at a similar point in time to test the efficacy of TiB₂ particles, would have included this additional free titanium. Therefore I conclude that claim 1 would not be obvious to the skilled worker on the basis of a combination of these two documents in view of the declaration.
25. Document A4 teaches an aluminium-copper casting alloy with up to 20% insoluble particles, with a specific example featuring 7% TiB₂ particles. These particles are stated to occupy the interdendritic regions of the alloy and thus overcome the “variability of the mechanical properties and structural integrity” of the alloy arising from “segregation of the alloying elements and the formation of interdendritic porosity particularly that which is surface connected” (see paragraphs 0021, 0022, 0032 and 0033). The requester asserts that it would be obvious to add the TiB₂ insoluble particles utilised in the alloy in A4 to one of the 2XX.X Al-Cu alloys disclosed in A2.
26. This is a similar argument to that in relation to A1 and A2. On the basis of the declaration, I consider that the skilled worker faced with the teaching of A2 and A4 would prepare a composition akin to A204R rather than one comprising additional free titanium as argued by the requester. Therefore I conclude that claim 1 would not be obvious to the skilled worker on the basis of a combination of documents A2 and A4.
27. Finally the requester relies on the combination of A3 and A4 to assert a lack of inventive step in claim 1. Document A3 teaches an Al-Cu alloy for casting in which titanium is added as a grain refiner. However, this document lacks any reference to adding insoluble TiB₂ particles. As noted above, A4 teaches an aluminium-copper casting alloy with up to 20% insoluble particles with improved casting properties and thus the requester asserts that it would be obvious to include a hyperperitectic quantity of titanium to the alloy of A4 to arrive at the present invention. I do not find this argument convincing. Document A3 states at column 7 lines 15-18:

“Titanium is a good grain refiner. The range of .20% to .50% titanium

produces a fine grain in the alloy, which facilitates required dispersion of the copper throughout the alloy during solution heat treatment, with the result that castings can be made which are much stronger than castings made with previous aluminium casting alloys. There seems to be no strength gained by adding more titanium and the elongation drops as the alloy gets richer in titanium.”

Document A4 paragraphs 0032 and 0033 state:

“It will be seen that the conventional alloy shows a gradual decrease in copper concentration along the plate until the 3mm to 9mm junction ... is reached.

In contrast the test plate made from the alloy embodying invention [sic] containing titanium diboride particles showed no tendency to behave in this way.”

28. This relative lack of copper concentration was reflected in an increased tensile strength in the alloy of the invention in A4. Accordingly, even disregarding the declaration of Frederick Feiertag, the teaching of document A4 would in my view lead the skilled worker to believe that free titanium was unnecessary as the advantage afforded by free titanium (grain refinement facilitating good copper dispersion) was already provided by adding insoluble TiB₂ particles. Thus I conclude that claim 1 was not obvious in view of the combination of A3 and A4.

Conclusion

I am of the opinion that the claims are novel over the disclosure of document A1 and that the combinations of documents A1 and A2, A2 and A4 and A3 and A4 do not render the claims obvious.

Simon Grand

Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.