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**Datasheet for the decision
of 13 January 2015**

Case Number: T 1046/12 - 3.2.08
Application Number: 01420119.8
Publication Number: 1158068
IPC: C22F1/04, C22F1/053, C22C21/10
Language of the proceedings: EN

Title of invention:

Thick products made of heat-treatable aluminum alloy with improved toughness and process for manufacturing these products

Patent Proprietor:

Constellium France

Opponents:

Aleris Rolled Products Germany GmbH
Alcoa Inc.

Headword:

Relevant legal provisions:

EPC Art. 100(b)

Keyword:

Sufficiency of disclosure - (no)

Decisions cited:

Catchword:



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Case Number: T 1046/12 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 13 January 2015

Appellant:
(Patent Proprietor)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 5 March 2012
revoking European patent No. 1158068 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

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

Summary of Facts and Submissions

- I. By its decision posted on 5 March 2012 the opposition division revoked European patent No.1 158 068.
- II. The appellant (patent proprietor) lodged an appeal against that decision in the prescribed form and within the prescribed time limit.
- III. Oral proceedings before the Board of Appeal were held on 13 January 2015.
- IV. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or one of the auxiliary requests 1-5 all filed with letter of 13 July 2012.

The respondents (opponents 1 and 2) requested that the appeal be dismissed.

- V. Claims 1 and 8 of the **main request** (corresponding to auxiliary request 3 underlying the decision under appeal) read as follows:

"1. Rolled aluminum alloy product more than 12 mm thick, heat treated by solutionizing, quenching and artificial aging, having a fraction of recrystallized grains measured between one-quarter thickness and mid-thickness of the final wrought product smaller than 35% by volume, and a characteristic intercept distance between recrystallized areas greater than 250 μm ."

"8. Ingot for rolling made of a heat-treatable aluminum alloy having an as-cast grain size kept between 300 μm and 800 μm , which is suitable for the manufacture of wrought products for aircraft structural

members, wherein the alloy is an AlZnMgCu alloy with the following composition (% by weight):

Zn: 4-10 Mg : 1-4 Cu : 1-3.5 Cr < 0.3 Zr < 0.3 Si < 0.5
Fe < 0.5 Ti : 0.01-0.03 B : 1-10 ppm, other elements <
0.05 each and 0.15 total, the remainder being
aluminum."

Auxiliary request 1 differs from the main request in that it comprises only one independent claim, which corresponds to claim 1 of the main request.

Auxiliary request 2 differs from the main request in that the following features are added into claim 1:

"characterised in that it is made of an AlZnMgCu alloy with the following composition (weight %):

Zn:4-10 Mg : 1-4 Cu: 1-3.5 Cr < 0.3 Zr < 0.3 Si < 0.5
Fe < 0.5,
other elements < 0.05 each and < 0.15 total, the
remainder being aluminum."

Independent claim 7 corresponds to independent claim 8 of the main request.

Auxiliary request 3 differs from auxiliary request 1 in that the following features are added into claim 1:

"characterised in that it is made of an AlZnMgCu alloy with the following composition (weight %):

Zn:4-10 Mg : 1-4 Cu: 1-3.5 Cr < 0.3 Zr < 0.3 Si < 0.5
Fe < 0.5, having a Ti content between 0.01 and 0.03
weight % and a B content between 1 and 10 µg/g

other elements < 0.05 each and < 0.15 total, the remainder being aluminum."

Auxiliary request 4 differs from auxiliary request 3 in that the characteristic intercept distance between recrystallized areas is

"greater than 300 μm ".

Auxiliary request 5 differs from auxiliary request 3 in that the characteristic intercept distance between recrystallized areas is

"greater than 350 μm ".

VI. The following documents played a role for the present decision:

D13: Aluminium-Taschenbuch; 15. Auflage; Drossel, G. et al. p. 396-397; and

D18: Vatne, H.E. "Efficient grain refinement of ingots of commercial wrought aluminium alloys; Part I: Methods for grain refining"; Aluminium 75. Jahrgang 1999; p. 84-90, 200-203.

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

The patent in suit comprised sufficient information for the person skilled in the art to understand what was the "characteristic intercept distance" mentioned in claim 1 and how to measure it.

According to paragraph [0033] Figure 5 showed an inventive and a prior art material, wherein the characteristic intercept distance of the latter was

smaller. This distance was quantified by an image analysis method which was illustrated in Figure 4 and resulted in the average intercept distance. Hence, it was clear that the "characteristic intercept distance" was the same as the average intercept distance.

It was true that this average was obtained by individual intercept distances measured between recrystallized regions or areas and not between recrystallized grains. However, this did not introduce any ambiguity once the magnification to be used was fixed, as was the case for the patent in suit, which specified that the magnification of Figure 5 was 25X.

Therefore, the person skilled in the art had sufficient information to measure the "characteristic intercept distance". Since the patent in suit also described how materials with said "characteristic intercept distance" greater than 250 μm could be obtained, the invention of claim 1 of the main request was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

The same applied to the ingot of claim 8 of the main request. It was true that, in the examples of table 2, several compositions in accordance with claim 8 resulted in as-cast grain sizes outside the claimed range. However, the as-cast grain size did not depend solely on the composition but also on the casting conditions. The compositions specified in claim 8 provided, by the choice of appropriate casting conditions, a workable range for the obtention of an as-cast grain size between 300 μm and 800 μm . A guidance in this sense was also provided by D13 and D18. Hence, also the invention of claim 8 was sufficiently disclosed.

For the same reasons this conclusion applied also to the auxiliary requests.

VIII. The arguments of the respondents can be summarised as follows:

The patent in suit did not define what the "characteristic intercept distance" mentioned in claim 1 meant. In particular, it did not specify that this "characteristic" distance was the average intercept distance. Nor did the patent in suit clearly describe how to obtain this average intercept distance. This parameter was obtained, according to paragraph [0033], from individual intercept distances measured not between recrystallized grain but between recrystallized regions or areas. However, these areas and, as a consequence, the individual intercept distance depended on the magnification of the images, which was not stipulated by paragraph [0033]. Hence, the patent in suit did not disclose how to verify whether a product complied with the requirements on the "characteristic intercept distance" mentioned in claim 1.

Nor did the patent disclose how such a product according to claim 1 could be obtained, since the "characteristic intercept distance" was related to the as-cast grain size and, as explained in connection with claim 8, the as-cast grain size according to the patent could not be obtained over the whole claimed scope on the basis of the informations given in the patent.

It was a fact that the composition stipulated by claim 8 foresaw the presence of the grain refiner Ti in a certain range. However, table 2 disclosed that only for example 6, whose Ti content was at the lower limit of

this range, an as-cast grain size as claimed was obtained, whereas the other examples with higher Ti contents exhibited a smaller as-cast grain size than what was required by claim 8. Although the as-cast grain size could also be influenced by other factors of the casting process, the patent did not concretely teach how this was to be done. Hence, also the invention according to claim 8 was not sufficiently disclosed.

Therefore, the patent according to the main request could not be maintained.

Since at least the objections concerning claim 1 applied also to all the auxiliary requests, the patent could not be maintained on the basis of any of these requests either.

Reasons for the Decision

1. The appeal is admissible.
2. Main request - Sufficiency of disclosure
 - 2.1 Claim 1 of the main request relates to a rolled aluminium alloy product with a characteristic intercept distance between recrystallized areas greater than 250 μm . However, "characteristic intercept distance" is not an expression with a generally accepted meaning.

The appellant submitted that it is clear from the patent, in particular paragraph [0033], that the "characteristic intercept distance" is the same as the average intercept distance.

According to paragraph [0033] it can be observed in Figure 5 that the characteristic distance between recrystallized regions of the invention product is significantly larger than that of the prior art. This can be quantified by image analysis of etched L-ST micrographs, whereby individual intercept distances between recrystallized regions are measured and a stable and representative mean of such intercepts is obtained for several thousand measurements, and this mean is taken to be the average intercept distance. However, this paragraph, albeit describing how the different structure of the inventive and the prior art structure can be quantified in terms of average intercept distance does not actually state that this average is the "characteristic intercept distance". Hence, the person skilled in the art is left in doubt as to the definition of this parameter.

Furthermore, the patent in suit also fails to completely describe the process for obtaining said average intercept distance. As can be gathered from paragraph [0033] this average is obtained from measurements of individual intercept distances between recrystallised regions. As acknowledged by the appellant, these regions are not the recrystallised grains but rather recrystallised areas as they appear in a micrograph. However, the extent of these areas and, as a consequence, the value for the individual intercept distance associated with them depend on the magnification of the micrograph, since a higher magnification may reveal an unrecrystallised region which interrupts a recrystallised area and is not visible at lower magnification. Although it is true that the micrographs in Figure 5 are taken at a 25 X magnification (see paragraph [0025]), the patent in

suit does not stipulate that the same magnification is to be used for the measurements of the individual intercept distance. Accordingly, the patent does not provide sufficient information to measure these individual distances and obtain the average intercept distance in a reproducible way.

Therefore, the patent in suit does not sufficiently disclose how to verify whether a rolled product exhibits a "characteristic intercept distance" between recrystallized areas greater than 250 μm . However, this verification is a necessary step to be carried out to obtain the claimed product, since, as apparent from table 5 of the patent in suit, products obtained under similar conditions may or may not satisfy the requirement concerning the characteristic intercept distance.

Accordingly, the patent in suit 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 a person skilled in the art.

2.2 Moreover, the disclosure of the patent is also deficient in respect of the invention of claim 8. This claim is directed to an ingot for rolling made of a heat-treatable aluminium alloy having an as-cast grain size kept between 300 μm and 800 μm . The alloy composition comprises the grain refiner Ti in amounts in the range 0.01-0.03 wt%. However, in the examples of tables 1 and 2 the application of the casting conditions of example 1 leads to an as-cast grain size within the required range only for Ti contents at the lower limit of the claimed range, whereas higher Ti contents result in a smaller grains. Although it is accepted that the as-cast grain size may be adjusted

not only by controlling the compositions but also by adjusting other process parameters, the patent in suit, save for a general statement in this sense in paragraph [0018], does not provide any concrete guidance as to how this has to be done.

Nor can this guidance be found in documents D13 and D18 which have been cited by the appellant, given that none of them describes how a relatively coarse grained as-cast structure as required by claim 8 can be obtained for an Al alloy comprising Ti amounts as claimed.

Accordingly, the patent in suit does not disclose the invention of claim 8 of the main request in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art over its whole scope either.

3. Auxiliary requests

At least the deficiency concerning claim 1 applies also to each of the auxiliary requests, which all comprise a main claim to a rolled aluminium alloy product with a characteristic intercept distance between recrystallized areas in a given range.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



V. Commare

T. Kriner

Decision electronically authenticated