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Datasheet for the decision of 7 January 2025

Case Number: T 1628/22 - 3.2.01

Application Number: 16801151.8

Publication Number: 3374123

IPC: B23K35/28, B23K1/00, B23K15/00, B23K35/02, B32B15/01, C22C21/00, F28F21/08, C22F1/04, B23K101/14, B21B3/00, C22C21/02, C22C21/04, C22C21/10, C22F1/043, C22F1/053

Language of the proceedings: EN

Title of invention:
BRAZING SHEET AND PRODUCTION METHOD

Patent Proprietor:
Gränges AB

Opponent:
Novelis Koblenz GmbH

Headword:

Relevant legal provisions:
EPC Art. 100(b), 54, 56
RPBA 2020 Art. 12(4), 12(6)

Keyword:
Grounds for opposition - insufficiency of disclosure (no)
Novelty - (yes)
Inventive step - (yes) - improvement not credible - defining the technical problem
Late-filed evidence - should have been submitted in first-instance proceedings (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1628/22 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 7 January 2025

Appellant: (Opponent)	Novelis Koblenz GmbH Carl-Spaeter-Strasse 10 56070 Koblenz (DE)
Representative:	Weickmann & Weickmann PartmbB Postfach 860 820 81635 München (DE)
Respondent: (Patent Proprietor)	Gränges AB Linnégatan 18 Box 5505 114 85 Stockholm (SE)
Representative:	Valea AB Box 1098 405 23 Göteborg (SE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 2 May 2022 rejecting the opposition filed against European patent No. 3374123 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	G. Pricolo
Members:	M. Geisenhofer
	A. Jimenez

Summary of Facts and Submissions

I. The appeal was filed by the appellant (opponent) against the decision of the opposition division to reject the opposition filed against the European patent EP 3 374 123.

II. The opposition division decided that
- the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art;
- the subject-matter of the claims as granted was novel over document
  D1 JP 2009-161827 A
- the subject-matter of the claims as granted was inventive over document D1 but also over a combination of D1 with one of documents
  D2 EP 2 431 121 A2 or
  D3 EP 2 017 032 A2,
  and over a combination of document
  D5 JP 2009-167509 A
  with any of documents D1, D2 or D3.

III. With their grounds of appeal, the appellant (opponent) filed the following additional documents:
D6 US 2001/0010866 A1
D7 US 2006/0014043 A1

IV. Oral proceedings were held before the Board.

(a) The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

(b) The respondent (patent proprietor) requested that the appeal be dismissed, i. e. the patent be maintained as granted (main request), in the alternative that the patent be maintained in amended form based on one of the auxiliary requests 1 – 6 filed on 19 November 2020 in opposition proceedings.

V. Claim 1 of the main request reads as follows:

"*A brazing sheet comprising a core layer made of a first aluminium alloy, attached to one side of said core layer a sacrificial cladding made of a second aluminium alloy, attached to the other side of said core layer a braze cladding made of a third aluminium alloy, wherein said first aluminium alloy consists of:*

Si	*0.2-1.0 wt%*
Fe	*0.15-1.0 wt%*
Cu	*0.2-0.9 wt%*
Mn	*1.0-1.6 wt%*
Mg	*≤0.3 wt%*
Cr	*0.05-0.15 wt%*
Zr	*0.05-0.25 wt%*
Ti	*0.05-0.25 wt%*
Other elements	*≤0.05 wt% each and ≤0.2 wt% in total*
Al	*balance up to 100 wt%;*

said second aluminium alloy consists of:

Si	*0.45-1.0 wt%*
Fe	*≤0.4 wt%*
Cu	*≤0.05 wt%*
Mn	*1.2-1.8 wt%*
Ti	*≤0.10 wt%*
Zn	*1.3-5.5 wt%*
Zr	*0.05-0.20 wt%*
Other elements	*≤0.05 wt% each and ≤0.2 wt% in total*
Al	*balance up to 100 wt%;*

and, said third aluminium alloy has a melting point lower than said first and second aluminium alloys."

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

(a) The patent did not disclose the invention in a manner sufficiently clear and complete for a skilled person to carry it out.

(b) The subject-matter of claim 1 was not novel over example 8 of D1.

(c) The subject-matter of claim 1 lacked an inventive step over document D1 alone but also over a combination of D1 with one of documents D2, D3, D6 or D7, and a combination of D5 with D1, D2 or D3.

(d) D6 and D7 should be admitted since they were highly relevant.

VII. The respondent's arguments can be summarized as follows:

(a) The patent disclosed suitable alloys that could be used to carry out the claimed brazing sheet.

(b) Claim 1 was novel since the alloy G of the core layer in example 8 of D1 lacked chromium. Furthermore, D1 did not provide information on how much iron was contained in the core layer.

(c) The skilled person would not consider example 8 of D1 as a suitable starting point for an argument on inventive step. Furthermore, the skilled person would not consider adding chromium to the alloy G

used for the core layer and even if, they would not use the claimed amount.

(d) D5 was a less promising starting point since it concerned a brazing sheet with four layers such that the skilled person would not combine the teachings of documents D1 - D3 disclosing three layers only with D5.

(e) Documents D6 and/or D7 should not be admitted since they should have been filed already during opposition proceedings.

Reasons for the Decision

Main Request

Sufficiency of Disclosure

1. The patent discloses the invention in a manner sufficiently clear and complete for the skilled person to carry it out (Article 100(b) EPC).

1.1 The opposition division held that a suitable alloy for the braze cladding was described for example in paragraph [0033] whereas suitable compositions for the alloys of core layer and sacrificial layer could be found in claim 1. When applying the braze cladding, chromium may diffuse during heating and hot rolling from the core layer into the braze cladding such that the braze cladding may also contain intermetallic particles comprising chromium albeit no chromium was present in the originally applied alloy (reasons for the decision 10).

1.2 The appellant relied on the same arguments already presented during opposition proceedings. They argued that the alloy forming the braze cladding could not comprise intermetallic particles comprising chromium in the absence of chromium in the originally applied material of the braze cladding, contrary to what was required by dependent claim 6.

1.3 The appellant has not identified a reason why the opposition division's assertion with regard to the presence of intermetallic particles comprising chromium in the braze cladding due to diffusion of chromium was wrong. The Board hence sees no reason to deviate from the opposition divisions's decision with regard to sufficiency.

Novelty

2. The subject-matter of claim 1 is novel (Article 54 EPC).

2.1 The opposition division held that the subject-matter of claim 1 is novel over example 8 of table 4 of D1 since alloy G lacks iron in the amount of 0.15-1.0 wt% and chromium in the amount of 0.05-0.15 wt% (reasons for the decision 11).

2.2 The appellant argued that the core layer comprised according to paragraph [0041] iron in an amount of 0.1-0.4 wt% (hence anticipating the amount of 0.15-1.0 wt% of iron as required by claim 1) and according to paragraph [0043] chromium in an amount of up to 0.3 wt% (hence anticipating the amount of 0.05-0.15 wt% of chromium as required by claim 1).

2.3 The Board notes that paragraph [0043] does not refer to the particular alloy G according to table 2 but refers generally to possible additives that could be used with any core material. The expression "*may contain 0.3% by mass or less of Cr*" cannot be understood as requiring necessarily any core layer material mentioned in D1 (thus including alloy G) to comprise up to 0.3 wt% of chromium, but the passage only provides a very general teaching on optional additives.

The same applies to paragraph [0041] which refers to an iron amount of 0.1-0.4 wt% that "*usually*" is used, hence not necessarily in any case.

2.4 Furthermore, the disclosure of "up to 0.3 wt% of chromium" cannot be regarded as a disclosure of values within the range of 0.05-0.15wt% defined in claim 1 as the lower value for the disclosed range is left open.

2.5 The Board hence shares the opposition division's view that D1 lacks a direct and unambiguous disclosure that alloy G described in D1 contains iron and chromium, and in particular in the ranges specified in claim 1 in combination, such that the opposition division's decision with regard to novelty was correct.

Inventive Step

3. The subject-matter of claim 1 is not rendered obvious (Article 54 EPC).

4. The opposition division held that the subject-matter of claim 1 is inventive when starting from **document D1** (reasons for the decision 12.1-12.3).

4.1 The appellant considered that example 8 (using alloys G, Gg and f) of D1 represented the closest prior art, from which the subject-matter of claim 1 differed in that the core layer contained iron in the amount of 0.15-1.0 wt% and chromium in the amount of 0.05-0.15 wt%.

This was undisputed.

4.2 The appellant submitted that the objective technical problem could be merely seen in the provision of an alternative core alloy. The Board essentially agrees, however with the proviso that the alternative alloy still has to provide a brazing sheet with good resistance to corrosion (see e.g. par. [0001] of the contested patent). Indeed it was not disputed that the claimed brazing sheet has - in general - adequate corrosion resistance properties.

4.2.1 The respondent argued that adding chromium allowed not only for an alternative material but for an increase of the material's resistance against corrosion as set out in paragraph [0023] of the patent in suit. The problem to be solved by the invention therefore must be formulated in a more restricted manner. In their view, the problem was to provide a material with improved resistance to corrosion.

4.2.2 The Board notes that there is no evidence that the addition of chromium to the core layer results in an increase of the resistance to corrosion. It is actually likely that the resistance to corrosion rather depends on the specific combination of the various additives used and not on chromium alone.

The patent itself discloses in table 1 a comparative example B with a core layer containing 0.1 wt% of chromium and an embodiment D according to the invention containing in the core layer 0.08 wt% of chromium. Albeit sheet D contains less chromium in the core layer, its corrosion behaviour is more favourable (cf. paragraph [0050]), i. e. a higher amount of chromium in the core layer does not necessarily result in higher resistance of the sheet against corrosion. This comparative example B hence shows that it is not just the amount of chromium in the core layer that determines the sheet's resistance to corrosion but it is the interaction of all additives added to the alloy used for the core layer including also the interaction with the sacrificial layer. Increasing the amount of chromium in the core layer alone hence not necessarily provides an increase in resistance to corrosion but can be even detrimental to its behaviour depending on the amount used.

4.3 The appellant argued that the skilled person was taught by paragraphs [0041] and [0043] of D1 that chromium could be added to the core layer and that a certain amount of iron was usual in any aluminium alloy. Adding chromium and iron in the amounts specified in claim 1 to the alloy G when producing example 8 is hence obvious from D1 itself.

4.3.1 As set out above, the Board considers these passages to provide a general statement on possible additives. Paragraph [0043] does not mention whether chromium influences the resistance to corrosion but only states that a chromium content of less than 0.3 wt% coarsens the crystal grain size after brazing. Whether a coarsening of the crystal grain size influences corrosion is not explained in this passage such that

the skilled person seeking an alternative alloy for the core layer of example 8 with adequate resistance to corrosion cannot assess how adding chromium to the alloy G influences the resistance to corrosion and hence would refrain from adding it.

4.3.2 Moreover, even if the skilled person would consider adding iron and chromium to the alloy G, they would not necessarily use the amounts required by claim 1 for chromium. Paragraph [0043] suggests an amount of less than 0.3 wt% of chromium, thus also including 0.2 wt%, 0.25 wt% or even 0.3 wt% which would not fall within the range of 0.05-0.15 wt% required by claim 1.

4.3.3 The subject-matter of claim 1 is hence not rendered obvious when starting from example 8 of D1 by the disclosure in paragraphs [0041] and [0043] of the same document.

4.4 The appellant further argued that adding iron and chromium in the amounts specified by claim 1 to the alloy G of D1 would also be rendered obvious by D2.

4.4.1 Document D2 discloses in paragraph [0030] that chromium in an amount of 0.05-0.3 wt% can be added to an alloy for providing enlarged crystallized grains after a brazing process such that the layer has a high strength.

4.4.2 Corrosion is again not mentioned in this passage such that the skilled person cannot derive from D2 whether chromium influences the resistance to corrosion and if, whether the resistance of corrosion can be increased by adding chromium.

4.5 The appellant further referred to the teaching of document D3.

4.5.1 D3 mentions in [0021] that chromium can improve corrosion resistance when applied in an amount of 0.02-0.3 wt%, preferably in an amount of 0.1-0.2 wt%.

4.5.2 The appellant argued that the skilled person would hence use chromium in the alloy G of example 8 of D1 to improve the resistance to corrosion of the brazing sheet known from D1, at least for providing and alternative alloy with similar resistance to corrosion as alloy G.

4.5.3 The Board considers the teaching of D3 to be not directly applicable to the alloy G of example 8.

(a) The interaction between the various additives implies that the alloy's behaviour with regard to corrosion cannot be predicted with certainty when adding a further additive or when changing the amount of one of the additives, but has to be established for each alloy individually having regard to all the elements that are present.

(b) As the patent in suit itself demonstrates when disclosing comparative example B and the embodiment of the invention D, an increased amount of chromium may be detrimental to the resistance of corrosion as set out above when discussing the objective technical problem to be solved.

(c) A specific amount of an additive may thus result in different changes in an alloy's behaviour depending on the other additives used such that the resistance to corrosion of one alloy might be

increased by adding a particular additive in an particular amount whereas another alloy's resistance to corrosion decreases or remains unchanged.

The teaching in paragraph [0021] of D3 hence only applies to alloys that have a similar composition as the alloys disclosed in D3.

4.5.4 The alloy G of example 8 of D1, however, differs significantly from the alloys of D3.

Most examples disclosed in D3 for the core layer contain titanium and zirconium but no chromium, or chromium without titanium and zirconium (cf. alloys in tables 1 and 9). Only alloy A4 in table 1 uses a combination of chromium and titanium, whereas alloy G of example 8 of D1 uses a combination of titanium, zirconium and chromium - which combination is used in none of the examples given in D3.

Furthermore, alloy G of example 8 of D1 contains significantly more manganese (1.6 wt%) compared to the examples in tables 1 and 9 of D3, these examples using manganese in amounts of less than 1.1 wt%.

Since chromium alone (or only in combination with titanium) will not influence the corrosion resistance in the same way as a combination of titanium, zirconium and chromium, the skilled person cannot simply apply the amount suggested by paragraph [0021] of D3 for chromium to the alloy of D1.

4.5.5 Possibly, the skilled person would replace the alloy for the core layer in example 8 of D1 by the alloy A4 of D3.

This alloy indeed comprises 0,15 wt% chromium in combination with 0,15 wt% titanium, but at the same time significantly less manganese (0,5 wt% compared to 1,0-1,6 wt%) and significantly more magnesium (0,5 wt% compared to less than 0,3 wt%) than the core layer's alloy defined in claim 1.

4.5.6 The skilled person would hence not arrive at the brazing sheet of claim 1 in view of the teaching of D3 either.

4.6 The appellant finally argued that documents D6 and/or D7 would also render it obvious to add chromium to the alloy G of example 1 of D1.

4.6.1 Documents D6 and D7 were filed with the appellant's statement of grounds of appeal.

4.6.2 The respondent requested to not admit these documents since they should have been filed in opposition proceedings after the summons at the latest.

4.6.3 During opposition proceedings, the opposition division summoned the parties for oral proceedings and gave their provisional view on the case whereby they *inter alia* opined that

- the invention was sufficiently disclosed; and
- the subject-matter of claim 1 was novel over D1 and inventive over a combination of D1 with D2 and/or D3.

At the end of the oral proceedings, the opposition division's decision did not deviate from their preliminary opinion but confirmed it.

4.6.4 Filing documents D6 and D7 was hence not occasioned by a decision of the opposition division that was surprising to the appellant and of which they only became aware with the written decision.

(a) The appellant alleged with letter dated 16 November 2023 that the filing was "*in response to the Patentees arguments as to inclusion of all of Ti, Cr and Zr in the core layer*" (cf. page 6, third paragraph).

(b) However, the argument that D3 lacks disclosure of a combination of titanium, chromium and zirconium was already brought forward by the patentee during opposition proceedings and taken up by the opposition division in their preliminary opinion (cf. second paragraph in point 7.3), such that D5 and D6 should have indeed been filed in response to the summons during opposition proceedings and not only in appeal proceedings.

4.6.5 The Board therefore did not admit documents D6 and D7 (Article 12(4) and (6) RPBA).

5. In a further line of argument, the appellant argued starting from **document D5 as closest prior art**. The opposition division was not convinced by this line of argument either (reasons for the decision 12.4.2).

5.1 The appellant alleged that a combination of document D5 with any of documents D1 - D3 would render the subject-matter of claim 1 obvious.

5.2 The Board shares the opposition division's view that the skilled person would not combine the teachings of D5 with any of D1 - D3 since D5 discloses a brazing

sheet with four layers whereas D1 - D3 disclose brazing sheets with three layers only.

5.2.1 A sacrificial layer being arranged adjacent to the core layer and providing a surface to the environment in the three-layer design reacts differently than an intermediate layer covered by a further layer, the intermediate layer hence not coming into contact with the environment.

5.2.2 The appellant argued that claim 1 is not restricted to brazing sheets with exactly three layers such that the brazing sheet of D5 fell under the definition of claim 1 since it comprised three layers. Independent claim 1 did not use the verb "to consist of" but "to comprise".

5.2.3 This is, however, not decisive, since for inventive step it must be assessed whether the skilled person would apply the teaching disclosed in connection with a brazing sheet with three layers to a brazing sheet with four layers.

5.2.4 In the Board's view, the intermediate layer of D5 covered with an additional layer cannot be compared to the sacrificial layers of D1 - D3 coming into direct contact with the environment. The Board hence follows the opposition division's decision and considers that the skilled person would not apply the teachings of documents D1 - D3 to D5.

5.3 The Board therefore shares the opposition division's decision that the subject-matter of the main request is not rendered obvious by the prior art.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Schneider G. Pricolo

Decision electronically authenticated