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**Datasheet for the decision  
of 20 May 2021**

**Case Number:** T 1953/19 - 3.2.01

**Application Number:** 14169250.9

**Publication Number:** 2808113

**IPC:** B23K1/00, B23K1/002, B23K1/008

**Language of the proceedings:** EN

**Title of invention:**  
Hybrid diffusion-brazing process

**Patent Proprietor:**  
General Electric Company

**Opponent:**  
Siemens Aktiengesellschaft

**Headword:**

**Relevant legal provisions:**  
EPC Art. 52(1), 54, 56, 111(1)  
RPBA 2020 Art. 11

**Keyword:**

Novelty - main request (yes)

Inventive step - main request (yes) - ex post facto analysis

Appeal decision - remittal to the department of first instance  
(no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**

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**Case Number: T 1953/19 - 3.2.01**

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 20 May 2021**

**Appellant:** General Electric Company  
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**Representative:** Freigutpartners IP Law Firm  
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**Respondent:** Siemens Aktiengesellschaft  
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**Representative:** Paul & Albrecht Patentanwälte PartG mbB  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 24 April 2019  
revoking European patent No. 2808113 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** G. Pricolo  
**Members:** V. Vinci  
S. Fernández de Córdoba

## Summary of Facts and Submissions

I. The appeal filed by the patent proprietor (appellant) is directed against the decision of the opposition division to revoke the European patent No. 2 808 113.

II. In its decision the opposition division held that the subject-matter of claim 1 as granted and according to the only auxiliary request lacked novelty in the meaning of Articles 52(1) and 54 EPC in view of the following prior art:

D1: EP 0 893 188 A

D3: GB 2 443 075 A

III. With the communication according to Article 15(1) RPBA dated 19 January 2021 the Board informed the parties of its preliminary assessment of the case.

IV. Oral proceedings pursuant to Article 116 EPC were held before the Board on 20 May 2021 by videoconference.

V. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted (main request) or, as an auxiliary measure, that the patent be maintained on the basis of one of the auxiliary requests 0 and 1 to 4 filed with the statement of grounds of appeal.

The respondent (opponent) requested that the appeal be dismissed.

VI. Claim 1 as granted reads as follows:

*'A hybrid diffusion-brazing process, comprising:*

*providing a component having a temperature-tolerant region and a temperature-sensitive region;*

*brazing a braze material to the temperature-tolerant region during a localized brazing cycle;*

*then heating the component in a furnace during a diffusion cycle;*

*wherein the brazing and the heating-diffusion braze the braze material to the component; and*

*wherein the localized brazing cycle is performed independent of the diffusion cycle in the hybrid diffusion-brazing process, characterized by*

*the hybrid diffusion-brazing process further comprising the step of maintaining the temperature-sensitive region below a tolerance temperature during the localized brazing cycle, wherein temperatures at or above the tolerance temperature cause the temperature-sensitive region to undergo one or more changes selected from the group consisting of micro-structural change, macro-structural change, melting, re-melting of existing braze joint, deformation, coating spallation, separation of sub-components, fatiguing, cracking, warping, deforming, and melting, wherein the tolerance temperature is lower than a brazing temperature of the braze material.'*

## **Reasons for the Decision**

### **Novelty: Articles 52(1) and 54 EPC**

1. The appellant contested the assessment of the opposition division that the subject-matter of claim 1

as granted lacked novelty over documents D1 and D3. To reach this conclusion the opposition division interpreted the expression '*temperature sensitive region*' as meaning any region that is not heated or which is thermally protected during the localized brazing cycle. In view of this interpretation, the opposition division came to the conclusion that the disclosure of both documents D1 and D3 was prejudicial to the novelty of the subject-matter of claim 1 as granted.

- 1.1 The Board cannot follow the interpretation and the consequent conclusion of the opposition division for the following reasons:
- 1.2 The very first step carried out according the method of claim 1 reads:

*'providing a component having a temperature-tolerant region and a temperature-sensitive region'*

As claim 1 requires that this first step is carried out before any localized brazing of the component takes place, the person skilled in the art would directly and unambiguously derive that the claimed '*temperature-tolerant region*' and the '*temperature-sensitive region*' do result from different inherent physical characteristics of the component in the respective region, rather than from a different exposition to the brazing temperature during the localized brazing cycle as asserted by the opposition division. Therefore, the interpretation of claim 1 provided by the opposition division which led to the alleged lack of novelty, according to which the two regions of the component referred to in claim 1 would only differ from each other in the different amount of heating that they

undergo during the localized brazing cycle, i.e. that they would be identifiable and distinguishable only as a result of how/where the localized brazing cycle is performed, cannot be followed. The Board is convinced that a person skilled in the art reading the claim as a whole and with a mind willing to understand realizes that the claimed component must have two different regions which are physically identifiable and physically distinguishable from each other before any brazing process takes place, namely a '*temperature-sensitive region*' having an inherent physical composition/structure/geometry such that this region will undergo anyone of the changes specified at the end of claim 1 at or above a certain '*tolerance temperature*', and a '*temperature-tolerant region*' which implicitly won't undergo anyone of these changes at said '*tolerance temperature*' because of its different inherent physical composition/structure/geometry which renders it more '*temperature-resistant*' (i.e. higher tolerance temperature) compared with the '*temperature-sensitive region*'. In other words, the formulation of claim 1 as granted clearly requires that the component is inherently provided with 2 physically different and identifiable regions showing different thermal behaviours when exposed to the brazing temperature, this different behaviour, which is characterized by different tolerance temperatures, being determined by their respective and inherent physical characteristics.

- 1.3 As convincingly argued by the appellant, this interpretation is consistently supported by the description of the embodiments given in paragraph [0018] of the contested patent where it is stated that the two regions at stake have either a '*different composition*' or a '*substantially similar composition*'. Regarding to the controversial interpretation of the

formulation '*substantially similar composition*', the Board shares the view of the appellant that '*substantially similar composition*' does not mean that the respective compositions of the regions are identical all over the component as asserted by the respondent, but rather that even a slight difference in the respective composition may determine the claimed different thermal behaviour (i.e. different tolerance temperatures). The respondent further argued that the statement on lines 19-21 of paragraph [0018] of the contested patent reading:

*'Additionally, differing load requirements during service provide differing tolerance temperatures for the same or differing compositions'.*

would support a broader interpretation of the claim according to which the '*temperature-tolerant region*' and the '*temperature-tolerant region*' of claim 1 may not be physically distinguishable before the localized brazing cycle takes place. However, in the Board's view, this statement is understood by a person skilled in the art in the light of the whole patent disclosure as meaning that even two regions of the component having the same compositions may be physically distinguishable and exhibit different thermal behaviours because of the provision of a different geometry (for example different thickness or shape) which may be required by different load requirements during service, said different geometry determining the claimed different thermal behaviour. Therefore, the interpretation of claim 1 given under above point 1.2 is consistent with all the passages cited by the respondent which do not justify the broader interpretation proposed by the opposition division in



the decision under appeal and by the respondent.

- 1.4 Furthermore, the Board concurs with the appellant that an hybrid diffusion-brazing process comprising the step of providing a component having a '*temperature-tolerant region*' and '*a temperature-sensitive region*' physically distinguishable from each other owing to different inherent compositions, mechanical characteristics or structures which result in a different thermal behaviour when exposed to the brazing temperature is not directly and unambiguously disclosed in any of the documents D1 or D3. In this respect the respondent correctly argued that document D1 is not restricted to a method of joining two components by brazing, as asserted by the appellant, but also embraces the repairing of blades by localized brazing in the meaning of claim 1. However, the Board cannot see how the step discussed above could be directly an unambiguously derived either from the cited passages of D1, see in particular column 7 of D1, line 1 onwards or from the embodiment in figure 5 discussed by the respondent which shows two components (50,52) joined by brazing. In fact there is no indication that either the blade (50) or the rotor (52) has been built up with a temperature-sensitive region and a temperature-tolerant region in the meaning of claim 1 of the contested patent. In absence of this indication the person skilled in the art will assume that either of them have an identical/homogeneous composition all through and an identical thermal behaviour. No temperature-sensitive and temperature-tolerant regions are thus disclosed in D1. The same applies to document D3 which is completely silent regarding the provision of a component undergoing a hybrid diffusion-brazing process showing physically distinguishable temperature-sensitive and

temperature-tolerant regions in the meaning of claim 1.

- 1.5 As no further novelty attacks have been raised by the respondent, the Board concludes that for the reasons presented above the subject-matter of claim 1 of the patent as granted is novel over the prior art in the meaning of Articles 52(1) and 54 EPC, thereby deviating from the assessment of the opposition division in the decision under appeal which is thus to be set aside.

**Possibility of remittal: Article 111 EPC**

2. In the decision under appeal the opposition division only addressed the ground of opposition under Article 100(a) EPC in combination with Article 54 EPC (lack of novelty). In view of the fact that the respondent argued inventive step on the basis of the same documents already discussed for novelty and of common general knowledge, and that at the oral proceedings the parties expressed themselves against a remittal of the case, the Board decided to exercise the power within the competence of the opposition division provided by Article 111(1) EPC and carry on the assessment of inventive step.

**Inventive Step: Articles 52(1) and 56 EPC**

3. As discussed above, the subject-matter of claim 1 of the patent as granted differs from the disclosure of D1 or D3 in the step of:

*'providing a component having a temperature-tolerant region and a temperature-sensitive region',*

wherein the expressions *'temperature-sensitive region'* and *'temperature tolerant-region'* are interpreted by

the person skilled in the art as discussed under above point 1.2.

- 3.1 The technical effect achieved by this distinguishing feature in combination with the further steps defined in claim 1 is that a comparatively higher brazing temperature can be applied without damaging the component and causing local distortions and/or dimensional deviations therein. This allows for less restrictions in the selection of the filler material because a comparatively higher brazing temperature can be applied.
- 3.2 The problem to be solved by the contested patent can thus be seen as improving the known hybrid diffusion-brazing method in order to allow for the use of higher brazing temperatures and thus for a larger choice of suitable filler materials, while avoiding at the same time any risk of thermal distortions in the component which may negatively affect its dimensional tolerances and thus its functionality.
- 3.3 The Board concludes that the solution of this technical problem as defined in independent claim 1 of the patent as granted involves an inventive step in the meaning of Articles 52(1) and 56 EPC for the following reasons:

Starting from a generally known hybrid brazing method (see for example D1 or D3) there is no hint in the available prior art which may direct the person skilled in the art to the idea of building up beforehand the component to which the braze material will be brazed by providing two inherently different and distinguishable regions showing a different behaviour when exposed to the high brazing temperatures, according to the

distinguishing feature above.

3.4 The respondent argued that claim 1 does not in fact define any concrete technical measure suitable to solve the technical problem at stake, but merely states a technical result to be achieved. Furthermore, the problem of avoiding distortion in the brazing area of the component which may negatively affect its dimensional tolerances is well known by the person skilled in the art and clearly addressed for example in documents D1 and D3. The respondent concluded that starting from D1 or D3 it would be obvious for the person skilled in the art to build up the component with a comparatively temperature-tolerant region to which the braze material can be brazed without causing any distortion at a certain brazing temperature, the remaining region corresponding to the temperature-sensitive region of claim 1. Consequently it was alleged that the person skilled in the art, starting from the method of D1 or D3 and aiming to solve the technical problem underlying the contested patent, would arrive without inventive step to the subject-matter of claim 1 as granted by simply applying common general knowledge.

3.5 The arguments put forward by the respondent in support of the alleged lack of inventive step are not convincing for the following reasons:

Contrary to the assertion of the respondent, the first step of claim 1 consisting in building up the component in such a way that it has a temperature-tolerant region and a temperature-sensitive region which are physically and inherently distinguishable from each other represents indeed a concrete technical measure and not a mere statement of a technical effect to be achieved.

Furthermore, the respondent failed to demonstrate that starting from D1 or D3 it would be obvious for the person skilled in the art to introduce the distinguishing step above simply in view of the applicable common general knowledge. In fact, there is no hint in the available prior art encouraging the person skilled in the art to apply this technical measure nor the allegation of the respondent that this step would fall within the customary practice followed by a person skilled in the art has been convincingly substantiated. The Board thus agrees with the appellant that the reasoning of the respondent results in a post-facto analysis of the available state of the art based on hindsight knowledge of the invention.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar:

The Chairman:



D. Magliano

G. Pricolo

Decision electronically authenticated