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Datasheet for the decision of 6 December 2017

Case Number: T 1086/15 - 3.2.01

Application Number: 09749234.2

Publication Number: 2344378

IPC: B64C1/12, B32B5/02, B32B15/00

Language of the proceedings: EN

Title of invention:
SYSTEM AND METHOD FOR INTEGRALLY FORMING A SUBSTRUCTURE ELEMENT WITH A FIBER METAL LAMINATE

Patent Proprietor:
The Boeing Company

Opponent:
Airbus Operations SAS/Airbus Operations Limited/
Airbus Operations GmbH/Airbus Operations S.L./

Headword:

Relevant legal provisions:
EPC Art. 84, 56
RPBA Art. 13(1)

Keyword:
Clarity (yes)
Inventive step (yes)
Admissibility of auxiliary request (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

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Case Number: T 1086/15 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 6 December 2017

Appellant: (Patent Proprietor)	The Boeing Company 100 North Riverside Plaza Chicago, IL 60606-1596 (US)
Representative:	Witte, Weller & Partner Patentanwälte mbB Postfach 10 54 62 70047 Stuttgart (DE)
Appellant: (Opponent)	Airbus Operations SAS/Airbus Operations Limited/ Airbus Operations GmbH/Airbus Operations S.L./ NFGI- M0101/1/316 Route de Bayonne/New Filton House/Kreetslag 10/Avenida de John Lennon S/N 31060 Toulouse FR/Bristol BS99 GB Hamburg 21129 DE/Madrid ES (FR)
Representative:	Santarelli 49, avenue des Champs-Elysées 75008 Paris (FR)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 18 March 2015 concerning maintenance of the European Patent No. 2344378 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	C. Narcisi
	S. Fernández de Córdoba

Summary of Facts and Submissions

I. European patent No. 2 344 378 was maintained in amended form by the decision of the Opposition Division posted on 18 March 2015. Against the decision an appeal was filed by the Opponent on 26 May 2015 and by the Patentee on 28 May 2015 and the respective appeal fees were paid. The statement of grounds of appeal was filed by the Opponent on 27 July 2015 and by the Patentee on 28 July 2015.

II. Oral proceedings took place on 6 December 2017. The Opponent (Appellant I) requested that the impugned decision be set aside and that the patent be revoked. The Patentee (Appellant II) requested that the impugned decision be set aside and that the patent be maintained in amended form on the basis of the main and sole request as filed (on 6 December 2017) during the oral proceedings before the Board.

III. Claim 1 reads as follows:

"A unitized assembly, comprising: a fiber metal laminate having non-metallic and metallic plies (16, 14) arranged in an alternating relationship, and an innermost metallic ply (20), and
at least one additive layer (30, 32) deposited onto innermost metallic ply (20) of the fiber metal laminate by friction stir welding,
wherein the additive layer (30, 32) comprises a plurality of additive layers including a first layer (32) deposited onto the innermost ply (20), wherein the plurality of additive layers are successively deposited onto the first additive layer by friction stir welding."

Claim 4 reads as follows:

"A method of forming a unitized assembly, comprising the steps of:
providing a fiber metal laminate having non-metallic and metallic plies arranged in an alternating relationship and having at least one innermost metallic ply; and
depositing at least one additive layer onto the innermost metallic ply of the fiber metal laminate by friction stir welding to form a friction stir welded preform,
wherein the additive layer (30, 32) comprises a plurality of additive layers including a first layer (32) deposited onto the innermost ply (20), and
depositing the plurality of additive layers successively onto the first additive layer by friction stir welding."

Claim 7 reads as follows:
"A method of forming a unitized assembly, comprising the steps of:
providing a stock member;
depositing at least one additive layer onto the stock member by friction stir welding to form a friction stir welded preform, wherein the additive layer (30, 32) comprises a plurality of additive layers including a first layer (32) deposited onto the innermost ply (20), wherein the plurality of additive layers are successively deposited onto the first additive layer by friction stir welding;
machining the friction sir welded preform to form an outer surface of an innermost metallic ply of a fiber metal laminate;

laying up non-metallic and metallic plies on the outer surface of the innermost metallic ply to form the fiber metal laminate;
machining the friction stir welded preform to form an inner surface of the innermost metallic ply; and
machining the friction stir welded preform to form at least one substructure element integral with the innermost metallic ply."

IV. The Opponent's arguments may be summarized as follows:

Having regard to the state of the proceedings the main request should not be admitted into the appeal proceedings, for it was filed at a very late stage only during oral proceedings.

Product claim 1 lacks clarity, for the added features originate from granted method claim 8 (not depending on granted claim 1), thereby mixing features relating to a method and features relating to a product. Furthermore, all three claims 1, 4 and 7 are unclear, the added feature being ambiguous as to the manner in which said layers are successively deposited onto the innermost metallic ply.

The subject-matter of claim 1 is not inventive over document E3 (US-A1-2008/0006741), representing the closest prior art, and E6 (US-A1-2003/0116609), in view of further documents E1 (EP-A1-1 336 469), E2 (US-A1-2008/0131656), E4 (US-A1-2005/0127139), E5 (US-B1-6 450 394) and E7 (US-A1-2002/0185207). Claim 1 differs from E3 in that "the at least one additive layer E3 is deposited onto innermost ply (20) of the fiber metal laminate by friction stir welding" (hereinafter designated as feature (i)) and in that "the additive layer comprises a plurality of additive layers

including a first layer (32) deposited onto the innermost ply (20), wherein the plurality of additive layers are successively deposited onto the first additive layer by friction stir welding" (hereinafter designated as feature (ii)). Concerning feature (i), it would be obvious for the skilled person to replace in the multilayer structure (or unitized assembly) disclosed in E3 the rivets joining the additive layer 14 (see E3, figure 3) to the innermost metallic ply 2 with a friction stir welded joint, as suggested by E6 (see paragraph [0009]). Further, feature (ii) is derived from the common general knowledge of the skilled person (in the field of manufacturing methods) including material adding techniques ("additive fabrication or manufacturing") and material removal techniques ("subtractive fabrication"), as known e.g. from E4 (figure 8, 16, 17;; [0026], [0029], [0042]) or E5 (e.g. column 2, lines 12 to 25; column 3, lines 28-39, column 4, lines 12-21), these techniques being applied in E4, E5 to the manufacturing of structural airframe components using additive layers joined by friction stir welding. In addition, documents E1 and E2 particularly suggest fabricating an innermost metallic ply including additive layers (see e.g. E2, figure 1, innermost metallic ply 29 and additive layer 15; E5, metal laminate structure 5). Finally E7 teaches the advantages of using friction stir welding to connect a first metal piece to a second metal piece constituting a ply in a composite material. Therefore, the claimed subject-matter would be obvious for the skilled person in view of E3 and E6, and further in view of its common general knowledge (as exemplified by E4 and E5), bearing in mind that adding further (i.e. additive) layers to an innermost layer of a composite material (e.g. by friction stir welding) is likewise known in the art (see E1, E2, E7).

The subject-matter of method claim 4, including method features leading to the product of claim 1, does not involve an inventive step for the reasons mentioned in relation to claim 1.

The subject-matter of claim 7, being essentially equivalent to the combination of the subject-matter of present independent claim 4 and of independent claim 9 of auxiliary request 2 representing the amended form in which the patent was as upheld by the impugned decision, is not inventive in view of the aforementioned prior art. In effect, the subject-matter of method claim 9 of said auxiliary request 2 (essentially implying machining a stock member to form an outer surface of an innermost metallic ply of a fiber metal laminate, forming a fiber metal laminate on said outer surface, machining the stock member to form an inner surface of the innermost metallic ply and one substructure element) is not new over E2, or at least not inventive over E2 in view of E3, E4 or E5. Similarly, as seen hereinabove the subject-matter of claim 4 lacks an inventive step over E3 and E6. It ensues that for the same reasons the combined subject-matter of these two claims would be obvious for the skilled person in view of the aforesaid prior art.

V. The Patentee's arguments may be summarized as follows:

The main request should be admitted into the appeal proceedings since it results from the deletion of method claim 9 in said second auxiliary request (representing the amended form in which the patent was upheld by the impugned decision), and this could not take the Opponent by surprise or give rise to any complex issue to be discussed during the oral

proceedings. As to the further amendments in claims 1, 4 and 7 of the main request, these came in response to the discussion during oral proceedings before the Board.

The amendments do not lead to any question of clarity, for they evidently imply that the additive layers are successively deposited onto the first layer, which is itself deposited onto the innermost ply.

The subject-matter of claim 1 (and of related claim 4) is inventive over E3 and E6, also in view of the further cited prior art. Indeed, the skilled person starting from E3 would have no motivation to modify the known multilayer structural element (or unitized assembly) by adopting said features (i) and (ii).
It follows that the subject-matter of method claim 7, being essentially a combination of method claim 4 (corresponding to claim 1) and of former method claim 9 (see above), likewise involves an inventive step.

Reasons for the Decision

1. The Patentee's main request, which is derived from the auxiliary request 2 which was upheld by the impugned decision, was admitted into the appeal proceedings (Article 13(1) RPBA (Rules of procedure of the boards of Appeal)) since the Board considered that the deletion of method claim 9 in said auxiliary request 2 did not take the Opponent by surprise and did not raise any complex issue to be discussed. The further amendments to claims 1, 4 and 7 came in response to the discussion during the oral proceedings and merely limit the claim such as to specify that all additive layers

are deposited by friction stir welding, thus eliminating a possible ambiguity. In the Opponent's own opinion (as stated during oral proceedings) this would anyway not affect its line of argument on inventive step.

2. The subject-matter of claims 1, 4 and 7 is clear (Article 84 EPC).
First, the amendment according to feature (ii) (i.e. "the additive layer comprises a plurality of additive layers including a first layer (32) deposited onto the innermost ply (20), wherein the plurality of additive layers are successively deposited onto the first additive layer by friction stir welding"), originating from granted method claim 8, manifestly includes product features which are equivalent to and directly derived from the corresponding features of said granted method claim 8 (see patent specification, hereinafter designated as EP-B). No ambiguity therefore results from the mere fact that these features were part of a method claim.

Second, in the Board's view feature (ii) does not entail any ambiguity or lack of clarity, for its only reasonable interpretation is that a first layer is deposited by friction stir welding onto the innermost ply and that additive layers are successively deposited onto this first additive layer by friction stir welding. It is also noted that this is moreover shown by all the corresponding embodiments in EP-B and that anyway it is almost impossible to draft a claim such as to exclude any possible misinterpretation.

3. The subject-matter of claim 1 would not be obvious for the skilled person in view of E3 and E6, as well as considering further documents E4, E5, E1, E2 and E7.

The Board considers that at least feature (ii) does not result in an obvious manner from the aforementioned prior art. Indeed, none of the above documents discloses or suggests a multi-layer structure having an innermost metal layer and additive metal layers successively deposited onto said innermost metal layer by friction stir welding. In effect, E4 discloses (see figures 16, 17) connection metal pieces 24 and structural metal pieces 26 disposed on the base portion 22, these pieces being disposed laterally adjacent and contiguous to each other and being friction stir welded to each other and/or to the substrate (E4, [0042]). Therefore, this configuration is clearly different from a layer structure as claimed, having a plurality of additive layers successively deposited onto the first additive layer, which is deposited onto the innermost metal ply.

Similarly, E5 (see e.g. figures w34 to 36) does not disclose or suggest a configuration according to feature (ii) as claimed. Thus, even assuming E4 and E5 as representing common general knowledge relating to "additive fabrication" or "subtractive fabrication", it is nevertheless not to be seen that feature (ii) is directly and obviously deducible therefrom.

The same applies to documents E1, essentially disclosing a fiber metal laminate connected to a metallic base member, and to document E2, essentially disclosing a metallic base member and a metal layer being friction stir welded thereto. Finally E7 merely discloses a fiber metal laminate having an innermost metallic ply and a metal piece or layer which is friction stir welded thereto.

In conclusion, even assuming that the skilled person in view of E6 would contemplate in an obvious manner using friction stir welding to fix structural element 14 (see E3, figure 3) onto the innermost metal ply 2, there

would be no suggestion in the prior art, or derivable from common general knowledge, to form element 14 by depositing a plurality of additive layers onto innermost metal ply 2 and machining the preform to obtain said structural element 14. The skilled person would also have no motivation to manufacture the structural element 14 in said multilayer structure as shown in E3 according to feature (ii) (Article 56 EPC).

For the same reasons as stated hereinabove the subject-matter of method claim 4 (including the features relating to a method leading to the product of claim 1) and of method claim 7 (including additional features as compared to method claim 4) is not rendered obvious for the skilled person in view of the cited prior art.

The Board also notes that any line of argument on inventive step based on E2 would likewise not render obvious the subject-matter of claims 1, 4 and 7, as the disclosure of this documents is less pertinent to the claimed subject-matter than document E3, which is the closest prior art, as acknowledged by the Opponent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form with the claims according to the main request, as filed during the oral proceedings, and a description and figures to be adapted thereto.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated