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Aktenzeichen / Case Number / N° du recours : T 4/87 - 3.2.1

Anmeldenummer / Filing No / N° de la demande : 81 902 555.2

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 059 735

Bezeichnung der Erfindung: Hybrid Composite Structures

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : B32B 3/12

ENTSCHEIDUNG / DECISION

vom / of / du 19 May 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

The Boeing Company

Einsprechender / Opponent / Opposant :

Messerschmitt-Bölkow-Blohm GmbH

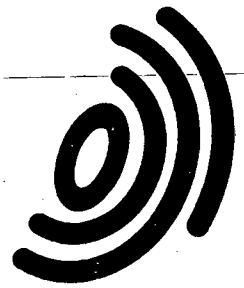
Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56; Rule 29(1)

Kennwort / Keyword / Mot clé :

Inventive step (yes) - two-part form of claims
(no ground of opposition)

Leitsatz / Headnote / Sommaire



Case Number : T 4/87 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 19 May 1988

Appellant :
(Opponent) Messerschmitt-Bölkow-Blohm GmbH
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Representative :

Respondent :
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Representative :
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Decision under appeal : Decision of the Opposition Division of the European
 Patent Office dated 9 October 1986 rejecting
 the opposition filed against European patent
 No. 0 059 735 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : P. Delbecque
Members : F. Gumbel
 F. Benussi

Summary of Facts and Submissions

I. Patent No. 0 059 735 was granted on 13 February 1985 with six claims in response to European patent application No. 81 902 555.2 filed on 8 September 1981 and published on 15 September 1982.

II. Independent Claims 1 and 5 read as follows:

1. A graphite reinforced composite structure (10) comprising: a graphite reinforced composite having the graphite (20a, 20b; 20c, 20d) terminate adjacent an area (18, 18a) to be joined with a metal fastener, a composite reinforced with Kevlar[®] (aromatic polyamide fibers of high tensile strength) (24a, 24b; 24c, 24d) abutting the graphite to extend across the join area, and a composite (28a, 28b; 28c, 28d) reinforced with Kevlar[®] to overlap the graphite (20a, 20b; 20c, 20d) and extend across the join area and form a unified composite structure (10).

5. A method of forming an aircraft composite structure (10) for securing the composite (10) to other structures with metal fasteners, with steps comprising: placing a layer of resin impregnated graphite (20a, 20b) over a honeycomb core (12) with the graphite layers terminating adjacent a side of the core (12) extending the covering layer with a layer (24a, 24b) of resin impregnated Kevlar[®] (aromatic polyamide fibers of high tensile strength) that extends sidewise past the core (12) and forming a fastening area (18) covering the fastening area (18) with a resin layer (28a, 28b) reinforced with Kevlar[®] that partially overlaps the graphite layers (20a, 20b) and curing the layers and forming a composite structure (10) for securing to other structures with fasteners.

III. A notice of opposition to this European patent was filed on 13 November 1985 by the Appellants, requesting that it be revoked since its subject-matter failed to meet the requirements of patentability according to Articles 52 to 57 EPC. The opposition was based on the following documents:

(1) CORROSION-Symposium, Seattle USA, March 20-22, 1979, page 439

(2) DE-B-2 545 929

(3) DE-A-2 325 732

(4) AIRBUS-INDUSTRIE, issue AK, 1978, pages 35 and 36.

IV. The Opposition Division rejected the opposition in a decision dated 9 October 1986. It is concluded in this decision that the combination of the teachings of documents (1) and (4) would not lead to the subject-matter of independent Claims 1 and 5 and that documents (2) and (3) are of no relevance concerning the patent-in-suit.

V. On 2 December 1986 the Opponents filed an appeal against this decision and simultaneously paid the appeal fee. In the Statement of Grounds of Appeal received on 7 February 1987 the Appellants argue essentially that

- the problem underlying the patent is known from document (3) which points out the importance of corrosion resistance;
- the essential features of present Claim 1 are also disclosed in this document (3); therefore, the patent-in-suit cannot be maintained having regard to this document;

- in addition, document (2) describes the use of graphite as a reinforcing material;
- graphite reinforced composite structures comprising measures for protection against corrosion are also mentioned in document (4).

The Appellants are of the opinion that the patent under discussion cannot be maintained, since none of the features specified in Claim 1 is novel. Consequently, they request that the decision of the Opposition Division be set aside and the patent be revoked.

- VI. The Respondents point out, in substance, that document (3), although mentioning the necessity of corrosion resistance in general does not deal with the specific problem underlying the present patent, i.e. to avoid corrosion caused by graphite when physically contacted by or electrically coupled to aluminium, nor does it suggest the solution to this problem indicated in independent Claims 1 and 5. They state that in this document no precautions are taken in the areas where the fasteners are located. The same would apply to document (2).

The Respondents request to reject the appeal as unfounded and to maintain the patent in its present form.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC; it is admissible.
2. In the Board's view independent Claims 1 and 5 are not open to objections concerning formal aspects. Their contents

correspond, in substance, to those of original Claims 1 and 5 and they clearly define the matter for which protection is sought and thus are considered to meet the requirements of Articles 123(2) and 84 EPC.

It is noticeable that neither independent claim is drafted in the two-part form. However, it does not appear to be expedient to inquire into this matter and, if necessary, to raise an objection under Rule 29(1) EPC at the present advanced stage of the proceeding, i.e. after grant of the patent, taking into account that a wrong or missing delimitation of a claim is not a ground for opposition. It would be different if a ground for opposition gave rise to an amendment of the claims anyhow. However, this is not the case for the reasons set out below.

3. Having regard to patentability of the subject-matter of Claims 1 and 5, it is immediately apparent that there is no prior art document which is suitable to destroy novelty of the composite structure indicated in Claim 1 or of the method of forming such a structure as set out in Claim 5. This just follows from the fact that a composite reinforced with Kevlar is not mentioned in any of the documents. The Appellants, although summing up at the end of their Statement of the Grounds of Appeal that none of the features of Claim 1 is novel, do not contend that those features are known in their combination from one single piece of prior art and, therefore, appear to attack inventive step rather than novelty. This also results from the fact that in addition to DE-A-2 325 732 (3) they mention further documents, namely DE-B-2 545 929 (2) and "Airbus Industrie" (4) in order to support their case.
4. Concerning the question whether the subject-matter of Claims 1 and 5, respectively, is rendered obvious by the available prior art, the following is observed:

- 4.1 Document (1) deals with the general problem underlying the patent, i.e. to avoid corrosion caused by graphite when physically contacted or electrically coupled to metal fasteners, specifically those consisting of aluminium. However, in order to solve this problem this document teaches to make use of an insulating layer between the aluminium component (hinge or actuator fitting) and the graphite reinforced structure (spar + skin) and to apply a plastics coating to the fastening bolt of titanium.
- 4.2 A similar solution is recommended in document (4) (Airbus Industrie), which deals with carbon fibre reinforced composites which are to be attached to metal components, in particular to an aluminium component. This document expressly states that any direct electrical contact between aluminium and carbon should be prevented.
- 4.3 As follows from the above observations, documents (1) and (4), although dealing with the same general problem as the invention claimed, do not give a lead to the solution as indicated in present Claims 1 and 5, even if taken in combination. Particularly, there is no hint to the idea of designing the structure in a manner that it does not have any graphite in the joining area penetrated by the metal fasteners. This idea, which is said in the patent-in-suit to be the object of the invention, is in reality the first and, in the Board's opinion, possibly the most important step towards the solution.

Moreover, there is no lead whatsoever in the above documents to the specific solution as claimed, i.e. to the lateral abutting arrangement of a Kevlar composite to each graphite-composition, and to the overlapping arrangement of

further Kevlar layers extending across the join area of both composites.

- 4.4 The further documents cited by the Appellants, i.e. DE-B-2 545 929 (2) and DE-A-2 325 732 (3) are not considered to be of relevance to the question of patentability of the subject-matter of present Claims 1 and 5. Document (2) is concerned with the manufacture of an attachment plate by winding fibre strands impregnated with synthetic resin around a bush. The attachment plate is connected to a structural part by means of an adhesive or the like (see column 5, line 28). The structural part may consist of fibre reinforced plastics material (column 6, line 19). It is true that this document mentions graphite fibres among other fibre materials as a suitable material for forming the fibre strands. It does, however, not deal with the problem of corrosion due to this material when contacted by a metal, in particular aluminium, and there is no disclosure whatsoever of a graphite free joining area where metal fasteners are to be located, adjacent to a structural part comprising a graphite reinforced composite.

Document (3) does not deal with the above problem either. This document describes a method of producing hollow articles by applying pliable sheets of glass fibre reinforced plastics material onto a mandrel and pressing those sheets together in order to obtain a preformed part of the hollow article. Those parts are, in a second pressing step, joined together, thus forming the intended hollow article. Preferably, the ends of the preformed parts terminate in a staggered configuration in order to allow an overlapping arrangement of the ends of the parts to be joined and thus ensuring a tight and strong connection between the parts. There is no suggestion as to how to tackle the problem of corrosion between a graphite

containing structural member and a metal fastener and there is also no mention of the idea of laterally extending a graphite reinforced composite structure by a joining structure reinforced with Kevlar in order to create a joining area free of graphite and thus to solve the above problem. The statement in this paragraph bridging pages 2 and 3, according to which there is a necessity of corrosion resistance, is of a very general nature and does not have any bearing on the specific problem underlying the patent-in-suit. For these reasons, the argument made by the Appellants, according to which the problem solved by the present invention is known from document (3) cannot be accepted and also the opinion that all of the essential features of Claim 1 are disclosed in document (3) is not supported by the facts.

- 4.5 For the above reasons it is summarised that the subject-matters of Claims 1 and 5 are not obvious having regard to the available prior art and hence involve an inventive step (Article 56 EPC). Consequently, they are patentable (Article 52(1) EPC).
5. It follows that Claims 1 and 5 are to be maintained in their granted form.
6. Claims 2 to 4 and 6 concern particular embodiments of the composite structure specified in Claim 1 and of the method indicated in Claim 5, respectively, within the meaning of Rule 29(3) EPC, and thus can also be upheld.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

S. Fabiani

The Chairman:

P. Delbecque