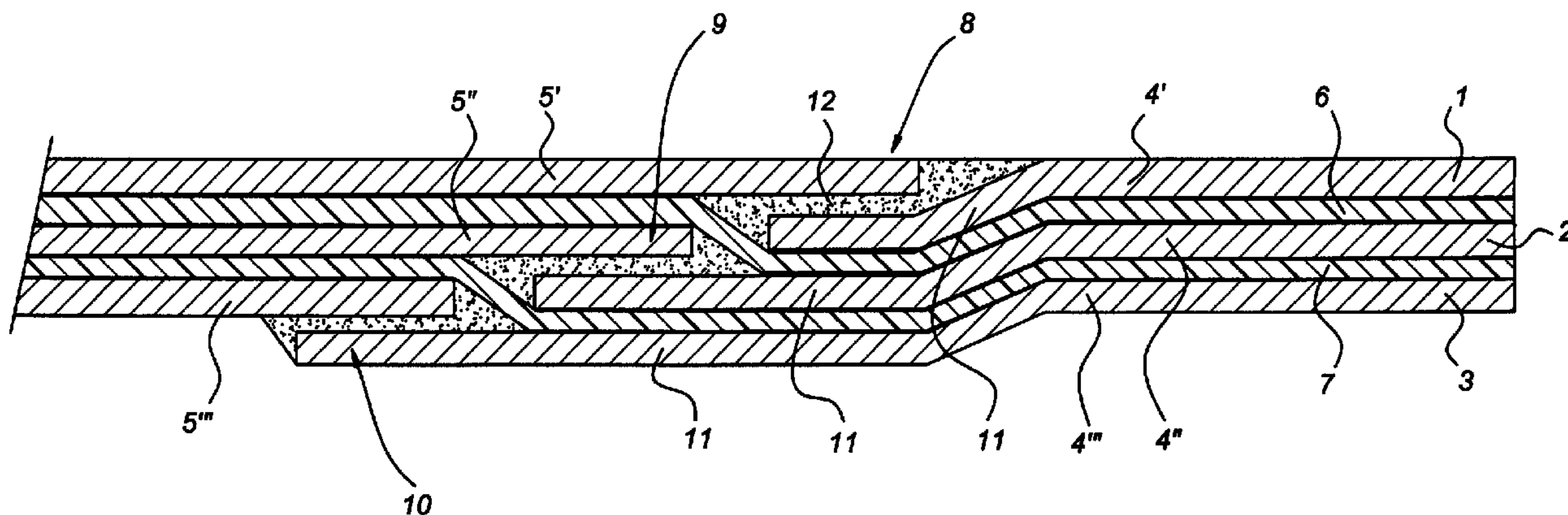




(86) Date de dépôt PCT/PCT Filing Date: 2001/05/09  
 (87) Date publication PCT/PCT Publication Date: 2002/10/10  
 (45) Date de délivrance/Issue Date: 2010/11/16  
 (85) Entrée phase nationale/National Entry: 2002/10/23  
 (86) N° demande PCT/PCT Application No.: NL 2001/000353  
 (87) N° publication PCT/PCT Publication No.: 2002/078950  
 (30) Priorité/Priority: 2000/05/09 (NL1015141)

(51) Cl.Int./Int.Cl. *B32B 15/08* (2006.01),  
*B32B 3/10* (2006.01)  
 (72) Inventeur/Inventor:  
ROEBROEKS, GERARDUS HUBERTUS JOANNES  
JOZEPH, NL  
 (73) Propriétaire/Owner:  
FOKKER AEROSTRUCTURES B.V., NL  
 (74) Agent: BERESKIN & PARR LLP/S.E.N.C.R.L.,S.R.L.

(54) Titre : STRUCTURE D'ASSEMBLAGE DANS UN LAMELLE DE COUCHES METALLIQUES ET PLASTIQUES  
 (54) Title: JOINT CONSTRUCTION IN A LAMINATE OF METAL AND PLASTIC LAYERS



(57) **Abrégé/Abstract:**

A joint construction in a laminate of, alternately, at least two metal layers (1-3) and at least one plastic layer (6,7) accommodated between them comprises metal layers which have at least two sections (4',5',-4'',5''). The two sections of at least one outer metal layer (4',5') overlap one another and are fixed to one another at the location of the overlap (8) by means of an adhesive (12). Each metal layer (1-3) has overlapping sections (8-10) which are fixed to one another by an adhesive (12).

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



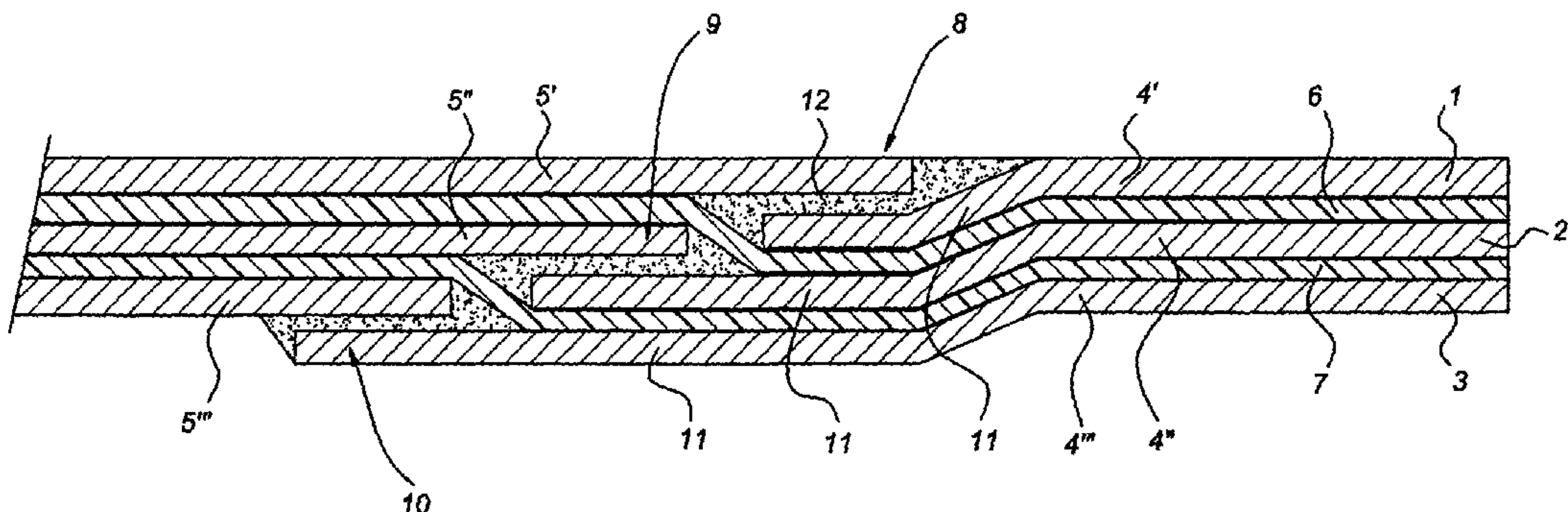
(43) International Publication Date  
10 October 2002 (10.10.2002)

PCT

(10) International Publication Number  
**WO 02/078950 A1**

- (51) International Patent Classification<sup>7</sup>: **B32B 15/08**, 3/10
- (21) International Application Number: PCT/NL01/00353
- (22) International Filing Date: 9 May 2001 (09.05.2001)
- (25) Filing Language: Dutch
- (26) Publication Language: English
- (30) Priority Data:  
1015141 9 May 2000 (09.05.2000) NL
- (71) Applicant (for all designated States except US):  
**FOKKER AEROSTRUCTURES B.V.** [NL/NL];  
Industrieweg 4, NL-3351 LB Papendrecht (NL).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **ROEBROEKS, Gerardus, Hubertus, Joannes, Jozeph** [NL/NL]; Bom-  
melsedijk 2, NL-3528 LB Den Bommel (NL).
- (74) Agent: **JORRITSMA, Ruurd**; Nederlandsch Octrooibu-  
reau, Scheveningseweg 82, P.O. Box 29720, NL-2502 LS  
The Hague (NL).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:**  
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: JOINT CONSTRUCTION IN A LAMINATE OF METAL AND PLASTIC LAYER



(57) Abstract: A joint construction in a laminate of, alternately, at least two metal layers (1-3) and at least one plastic layer (6,7) accommodated between them comprises metal layers which have at least two sections (4', 5', 4'', 5''). The two sections of at least one outer metal layer (4', 5') overlap one another and are fixed to one another at the location of the overlap (8) by means of an adhesive (12). Each metal layer (1-3) has overlapping sections (8-10) which are fixed to one another by an adhesive (12).



WO 02/078950 A1

Joint construction in a laminate of metal and plastic layers

The invention relates to a joint construction in a laminate of, alternately, at least two metal layers and at least one plastic layer incorporated between them, which metal  
5 layers each comprise at least two sections and the two sections of at least one outer metal layer overlap one another, which two sections are fixed to one another at the location of the overlap by means of an adhesive.

A joint construction of this type is disclosed in EP-A 983 141. This known joint construction has three metal layers, between which two plastic layers are accommodated.  
10 One of the outer metal layers has two sections which overlap one another in such a way that a smooth surface is obtained. The spaces next to the overlap are filled with the glue by means of which the overlapping parts of the sections are fixed to one another.

The other metal layers and the plastic layers continue on at the location of the overlap. These other metal layers also consist of two sections, the leading edges of which  
15 abut one another. The outer layer thereof is provided with a glued fixing strip at the location of the leading edges, which fixing strip, together with the plastic layer located on the other side of the sections, must provide for the transfer of force between said sections.

This known joint construction has a number of disadvantages. First of all the seam between the sections with leading edges abutting one another must have fairly accurately  
20 prescribed dimensions. This means that the sections themselves must have fairly accurate dimensions and also that the sections must be positioned accurately with respect to one another. A further disadvantage is that an additional joining strip has to be applied to one of the free sides of the joint construction. For these reasons a joint construction of this type is relatively inconvenient and expensive.

25 The aim of the invention is to provide a joint construction of the type described above that can be produced more simply. Said aim is achieved in that each metal layer has overlapping sections which are fixed to one another by means of an adhesive.

In the case of the joint construction according to the invention all sections can be produced and positioned with respect to one another with wide tolerance. The cost can  
30 consequently remain relatively low, without, however, this leading to inaccuracies or insufficient strength.

In this context the joint construction can be so constructed that the overlap between two sections of a metal layer is offset with respect to the overlap between two sections of

another metal layer.

The outside of the joint construction is continuous and smooth if, in each metal layer, one section is straight and the other section is joggled. Such an embodiment is important when the joint construction is used in panels for aircraft and the like.

5 The invention will be explained in more detail below with reference to an illustrative embodiment shown in the figure.

The figure shows a cross-section through a joint construction according to the invention. This joint construction comprises three metal layers 1 - 3, each of which consists of two sections 4', 5'; 4'', 5''; 4''', 5''' . Two layers of plastic material 6, 7, which, for  
10 example, consist of a matrix of glass fibres embedded in a resin, are arranged between the metal layers 1 - 3

The sections 4' - 5''' of each of the layers 1 - 3 overlap one another at the location of an overlap 8 to 10. For this purpose the one section 4' of the outer metal layer 1 has a section 11 that is joggled on and extends to below the other section 5'. The sections 4' and  
15 5' are glued to one another at the location of the overlap 8 by means of a layer 12 of glue.

For the sections 4'', 4''' of the other layers 2, 3 it is also the case that the section 11 thereof is joggled and extends to below the other section 5'', 5''' of said metal layer 2 or 3, respectively.

The plastic layers 6, 7 run through continuously at the location of the overlap 8 - 10.

Claims

1. Joint construction in a laminate of, alternately, at least two metal layers (1 – 3) and at least one plastic layer (6, 7) incorporated between them, which metal layers (1 – 3) each comprise at least two sections (4', 5'; 4'', 5''; 4''', 5''') and the two sections (4', 5') of each metal layer (1, 2, 3) overlap one another (8 – 10), which two sections (4', 5') are fixed to one another at the location of the overlap (8) by means of an adhesive (12).
2. Construction according to Claim 1, wherein the overlap (8) between two sections (4', 5') of each metal layer (1, 2, 3) is offset with respect to the overlap (9, 10) between two sections (4'', 5''; 4''', 5''') of the other metal layers.
3. Construction according to Claim 1 or 2, wherein, in each metal layer (1, 2, 3), one section (5', 5'', 5''') is straight and the other section (4', 4'', 4''') is joggled.
4. Construction according to Claim 1, 2 or 3, wherein each plastic layer (6, 7) is joggled at the location of an overlap (8, 10).
5. Construction according to Claim 1, 2, 3 or 4, wherein each plastic layer (6, 7) is continuous at the location of an overlap (8, 10).

