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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 December 2008 (18.12.2008)

PCT

(10) International Publication Number
WO 2008/151843 A4

(51) International Patent Classification:
B64C 7/02 (2006.01) *B64D 29/02* (2006.01)
B64C 23/06 (2006.01)

(21) International Application Number:
PCT/EP2008/004841

(22) International Filing Date: 16 June 2008 (16.06.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

10 2007 027 697.6	15 June 2007 (15.06.2007)	DE
10 2008 025 152.6	26 May 2008 (26.05.2008)	DE
61/056,038	26 May 2008 (26.05.2008)	US

(71) Applicant *(for all designated States except US)*: **AIRBUS DEUTSCHLAND GmbH** [DE/DE]; Kreetslag 10, 21129 Hamburg (DE).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **SCHWETZLER, Detlev** [DE/DE]; Gneisenauweg 9D, 27755 Delmenhorst (DE).

(74) Agent: **SCHATT, Markus F.**; Schatt IP, Rindermarkt 7, 80331 München (DE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

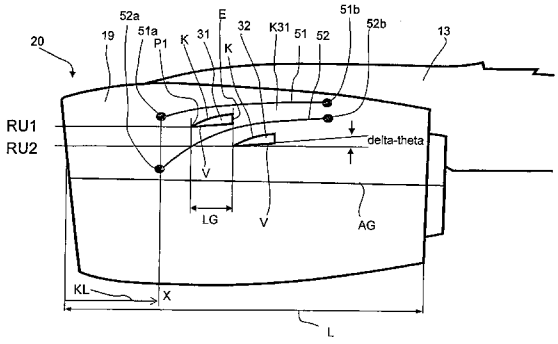
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report*
— *with amended claims*

Date of publication of the amended claims: 26 February 2009

(54) **Title:** ENGINE NACELLE OF AN AIRCRAFT COMPRISING A VORTEX GENERATOR ARRANGEMENT



Figur 5

(57) **Abstract:** An engine nacelle of an aircraft, which engine nacelle on one side comprises several fin-shaped vortex generators (3, 4, 5) so that with an increase in the angle of attack, to improve maximum lift, the field of vorticity generated by said vortex generators (3, 4, 5) overall extends over an increasing region of the wing in the direction of the wingspan, with the first vortex generator being located within a positioning corridor (K31) situated between two boundary lines (51, 52), wherein: • the starting point (51 a) of the first boundary line (51) is the circumferential point of the engine nacelle with the engine-nacelle circumferential angle phi = 35 degrees and the engine-nacelle longitudinal coordinate X = L/4; • the end point (51 b) of the first boundary line (51) is the circumferential point of the engine nacelle with the engine-nacelle circumferential angle phi = 25 degrees and the engine-nacelle longitudinal coordinate X = L2/3; • the starting point (52a) of the second boundary line (52) is the circumferential point of the engine nacelle with the engine-nacelle circumferential angle phi = 90 degrees and the engine-nacelle longitudinal coordinate X = L/4; • the end point (52b) of the second boundary line (52) is the circumferential point of the engine nacelle with the engine-nacelle circumferential angle phi = 55 degrees and the engine-nacelle longitudinal coordinate X = L2/3.

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AMENDED CLAIMS
received by the International Bureau on 05 January 2009 (05.01.09)

1. An engine nacelle (20) of an aircraft, which engine nacelle (20) comprises a nacelle housing (19) with a first side (S1) and a second side (S2) and several fin-shaped vortex generators (21, 22, 23; 31, 32) characterized in that the fin-shaped vortex generators (21, 22, 23; 31, 32) are arranged at least on one of the two sides (S1, S2) of the nacelle housing (19) and are arranged so as to overlap in longitudinal direction such that with an increase in the angle of attack, to improve maximum lift, the field of vorticity generated by them overall extends over an increasing region of the wing in the direction of the wingspan.

2. The engine nacelle (20) according to claim 1, characterised in that the frontmost point of a first vortex generator (31) is located within a positioning corridor (K31) situated between two boundary lines (51, 52), wherein:

- the starting point (51a) of the first boundary line (51) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 35 degrees and the engine-nacelle longitudinal coordinate X = L/4, wherein the angle phi is being defined such that phi has a value of zero at the position of a vertical axis of the housing (19) on the side of the engine pylon (13) and runs in the circumferential direction of the housing (19), wherein X is the position on a longitudinal coordinate(KL) extending along the longitudinal axis (AG) of the nacelle housing (19), with the point where the longitudinal axis (AG) intersects the area in which the rim line of the front end (30a) of the nacelle housing (19) is situated as the starting point of the longitudinal axis (AG), and wherein L is the length of the engine nacelle (20) along the longitudinal axis (AG) of the nacelle housing (19);

- the end point (51b) of the first boundary line (51) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 25 degrees and the engine-nacelle longitudinal coordinate X = L•2/3;

- the starting point (52a) of the second boundary line (52) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 90 degrees and the engine-nacelle longitudinal coordinate X = L/4;

- the end point (52b) of the second boundary line (52) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 55 degrees and the engine-nacelle longitudinal coordinate X = L•2/3;

wherein in each case the boundary line is the line that extends over the external circumference of the engine nacelle (20) and is the shortest line between the starting point of said external circumference and the end point of said external circumference.

3. The engine nacelle (20) according to claim 1 or 2, characterised in that the vortex generators are arranged on the side of the nacelle housing (19), which side faces towards the fuselage.

4. The engine nacelle (20) according to claim 2 or 3, characterised in that on the second side (S2) of the two sides (S1, S2) of the nacelle housing (19) at least one fin-shaped vortex generator (21, 22, 23; 31, 32) is arranged.

5. The engine nacelle (20) according to claim 4, characterised in that on both sides of the nacelle housing (19) several fin-shaped vortex generators (21, 22, 23; 31, 32) are arranged, wherein in each case the frontmost point of a first vortex generator (31) is located within a positioning corridor (K31) situated between two boundary lines, wherein:

- the starting point (51a) of the first boundary line (51) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 35 degrees and the engine-nacelle longitudinal coordinate X = L/4;

- the end point (51b) of the first boundary line (51) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 25 degrees and the engine-nacelle longitudinal coordinate X = L•2/3;

- the starting point (52a) of the second boundary line (52) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 90 degrees and the engine-nacelle longitudinal coordinate X = L/4;

- the end point (52b) of the second boundary line (52) is the circumferential point of the engine nacelle (20) with the engine-nacelle circumferential angle phi = 55 degrees and the engine-nacelle longitudinal coordinate X = L•2/3;

wherein in each case the boundary line is the line that extends over the external circumference of the engine nacelle (20) and is the shortest line between the starting point of said external circumference and the end point of said external circumference.

6. The engine nacelle (20) according to any one of the preceding claims, characterised in that the second vortex generator is situated on the engine's circumferential angle of phi = 10 to 30 degrees below the first vortex generator.

7. The engine nacelle (20) according to any one of the preceding claims, characterised in that the longitudinal direction of the vortex generators is inclined by delta-theta = 0 to 10 degrees in relation to the longitudinal axis of the engine nacelle (20).

8. The engine nacelle (20) according to any one of the preceding claims, characterised in that the vortex generators, which in a connection region (V) of same with the outer flow surface (A) of the nacelle housing have a length (LG) that extends in longitudinal direction of the vortex generator, comprise an external contour (K2) that protrudes from the outer flow surface (A) and that extends, gradually rising, from the outer flow surface (A) of the nacelle housing to a maximum height (HG) at the rear end of the respective vortex generator.

9. The engine nacelle (20) according to claim 8, characterised in that the external contour of at least one vortex generator is a straight line.

10. The engine nacelle (20) according to claim 8 or 9, characterised in that the ratio of the overall length LG to the maximum height HG of the vortex generator is between 1.4 and 3.6.

11. The engine nacelle (20) according to any one of the preceding claims 8 to 10, characterised in that the overall length LG of the vortex generator relative to the length of the engine nacelle (20) is between 0.10 and 0.15.

12. An engine nacelle (20), of an aircraft, which engine nacelle (20) comprises a nacelle housing (19) with a first side (S1) and a second side (S2) and several fin-shaped vortex generators (21, 22, 23; 31, 32) characterised in that the fin-shaped vortex generators (21, 22, 23; 31, 32) are arranged at least on one of the two sides (S1, S2) of the nacelle housing (19) and the distance of the external contour (K) of the vortex generator from the outer flow surface (A) defined by the gradient of the connection region (V) in longitudinal direction (X) of the vortex generator is defined by the function $Y = HG \cdot [1-(LG-X)^2 / LG^2]$, with:

- X being the longitudinal coordinate of the vortex generator with an overall length LG of the vortex generator;
- Y being the height coordinate of the vortex generator with a maximum height HG of the vortex generator in relation to the outer flow surface (A) on the longitudinal coordinate X=LG;

wherein the external contour (K) protruding from the outer flow surface (A) is within the range of ± 10% of the Y-value resulting from the function.

13. The engine nacelle (20) according to claim 12, characterised in that the area of the fins that form the vortex generators (3, 4, 5, 6) is arranged so as to be radial in relation to the engine nacelle (20).

14. The engine nacelle (20) according to claim 12 or 13, characterised in that the vortex generators are arranged on the side of the nacelle housing (19), which side faces towards the fuselage.

15. The engine nacelle (20) according to claim 12, 13 or 14, characterised in that on the second side (S2) of the two sides (S1, S2) of the nacelle housing (19) at least one fin-shaped vortex generator (21, 22, 23; 31, 32) is arranged.