

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
19 June 2008 (19.06.2008)

PCT

(10) International Publication Number
WO 2008/071399 A1(51) International Patent Classification:
B64C 7/00 (2006.01) B64C 9/02 (2006.01)

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(21) International Application Number:
PCT/EP2007/010831

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, 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, ZW.

(22) International Filing Date:
11 December 2007 (11.12.2007)

(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, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

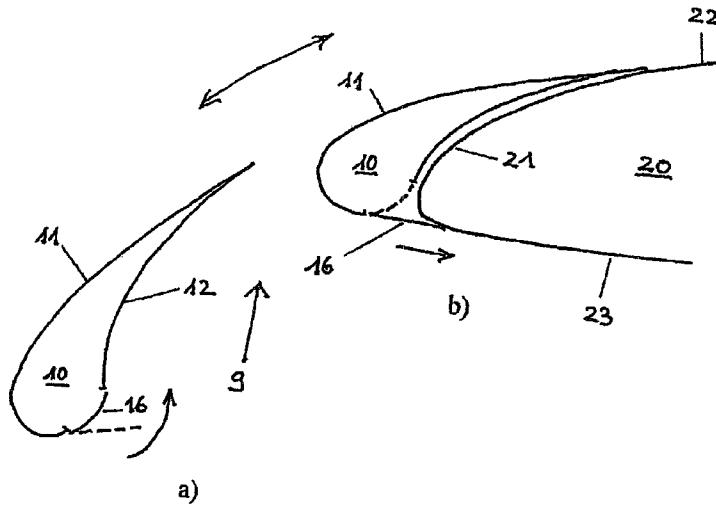
(25) Filing Language: English
(26) Publication Language: English
(30) Priority Data:
10 2006 058 650.6
11 December 2006 (11.12.2006) DE

Declarations under Rule 4.17:

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

(54) Title: WING OF AN AIRCRAFT



(57) **Abstract:** Wing of an aircraft having a mainplane (20), which has an upper face (22), a lower face (23) and an aerodynamical Iy shaped area (21), and having an additional airfoil (10) which is articulated on the mainplane (20) and can be extended from a retracted state with a slot area (9) being opened between the mainplane (20) and the additional airfoil (10) and having a variable-position slot-varying apparatus (16) which is arranged on the lower face, forms a part of the aerodynamic profile of the additional airfoil (10) or mainplane (20) when the additional airfoil (10) is extended, and at least partially covers the slot area (9) between the mainplane (20) and the additional airfoil (10) on the lower face when the additional airfoil (10) is in the retracted state. The slot -varying apparatus (16) can be varied between a curved configuration, in which it forms a part of the aerodynamic profile of the additional airfoil (10) or mainplane (20) when the additional airfoil (10) is extended, and an extended configuration, in which it at least partially covers the slot area (9) between the mainplane (20) and the additional airfoil (10) on the lower face when the additional airfoil (10) is in the retracted state.

WO 2008/071399 A1



— *of inventorship (Rule 4.17(iv))*

— *with amended claims and statement*

Published:

— *with international search report*

Date of publication of the amended claims and statement:

31 July 2008

AMENDED CLAIMS

received by the International Bureau on 16 June 2008 (16.06.08)

1. A wing for an aircraft, having:

- a mainplane (20), which has an upper face (22), a lower face (23) and a nose area (21) facing the flow (S),
- an additional airfoil (10), which is articulated on the mainplane (20) and has a nose area (11) facing the flow (S) and a rear-face area (12) facing the nose area (21) of the mainplane (20), and can be moved between a retracted state and an extended state with a slot (9) between the nose area (21) of the mainplane (20) and the rear-face area (12) of the additional airfoil (10) being varied, and
- a slot-varying apparatus (16; 26; 36; 46), which is arranged on the lower face of the additional airfoil (10), runs along the contour of the additional airfoil when the additional airfoil (10) is extended, and at least partially covers the slot area (9) between the mainplane (20) and the additional airfoil (10) on the lower face when the additional airfoil (10) is in the retracted state,

wherein the slot-varying apparatus (16; 26; 36; 46) is arranged at the transition between the nose area (11) and the rear-face area (12) of the additional airfoil (10) and can be varied between a curved configuration, in which when the additional airfoil (10) is extended, it forms a part of its aerodynamic profile with a curved transition from the nose area (11) to the rear-face area (12) of the additional airfoil (10), and an extended configuration, in which, when

the additional airfoil (10) is in the retracted state, it at least partially covers the slot area (9) between the mainplane (20) and the additional airfoil (10) on the lower face,

characterized in that

the slot-varying apparatus (16; 26; 36; 46) is designed to be elastically flexible at least in places in the profile chord direction of the wing or that the slot-varying apparatus (16) has flexibly variable curvature.

2. The wing as claimed in claim 1, characterized in that the front end of the slot-varying apparatus (16) in the profile chord direction is fixed to the additional airfoil (10).

3. The wing as claimed in claim 1 or 2, characterized in that the front end of the slot-varying apparatus (26; 36; 46) in its profile chord direction is mounted such that it can rotate about the span direction with respect to the additional airfoil (10) and has a curved part (26; 38; 48) which forms the curved transition from the nose area (11) to the rear-face area (12) of the additional airfoil (10) when the additional airfoil (10) is extended and, at its rear end in the profile chord direction, has an extended part (29; 39; 49) which at least partially covers the slot area (g) between the mainplane (20) and the additional airfoil (10) on the lower face when the additional airfoil (10) is in the retracted state.

4. The wing as claimed in one of claims 1 to 3, characterized in that the slot-varying apparatus (16; 26; 36; 46) can be varied between the curved configuration and the extended configuration by aerodynamic forces acting between the mainplane (20) and the additional airfoil (10).

5. The wing as claimed in one of claims 1 to 3, characterized in that the slot-varying apparatus (16; 26; 36; 46) can be varied between the curved configuration and the extended configuration by means of a drive device (17; 27; 37; 47) which is coupled to the slot-varying apparatus (16; 26; 36; 46).

6. The wing as claimed in claim 5, characterized in that the drive device (37) is arranged in the slot-varying apparatus (26).

7. The wing as claimed in claim 6, characterized in that the drive device (37) is arranged in the curved part (28) of the slot-varying apparatus (26) which forms the curved transition from the nose area (11) to the rear-face area (12) of the additional airfoil (10).

8. The wing as claimed in claim 5, 6 or 7, characterized in that the drive device (47) is kinematically coupled to the movement of the additional airfoil (10) with respect to the mainplane (20) in the sense of positive movement of the slot-varying apparatus (46) during extension and retraction of the additional airfoil (10).

9. The wing as claimed in claim 8, characterized in that the drive device (47) is kinematically coupled to a rail by means of which the additional airfoil (10) is articulated on the mainplane (20).

10. The wing for an aircraft, comprising a mainplane (20), which has an upper face (22), a lower face (23) and an aerodynamically shaped rear-face area (25), an additional airfoil (70), which is arranged on the rear face of the mainplane (20) and is articulated on the mainplane (20), an aerodynamically shaped nose area (71) facing the rear-face area (25) of the mainplane (20), and which can be moved between a retracted and extended state opening a slot area (79) between the rear-face area (25) of the mainplane (20) and the nose area (71) of the additional airfoil (70), the wing comprising a variable-position slot-varying apparatus (76) which is arranged on the rear face of the mainplane (20) and, when the additional airfoil (70) is extended, it forms a part of the aerodynamic profile of the mainplane (20) and, when the additional airfoil (70) is in the retracted state, at least partially covers the slot area (79) between the mainplane (20) and the additional airfoil (70) on the lower face, with the slot-varying apparatus (76) being arranged at the transition between the lower face (23) and the rear-face area (25) of the mainplane (20) and can be varied between a curved configuration, in which it forms a part of the aerodynamic profile of the mainplane (20) at the curved transition from the lower face (23) to the rear-face area (25) of the mainplane (20) when the

additional airfoil (70) is extended, and an extended configuration in which it at least partially covers the slot area (79) between the mainplane (20) and the additional airfoil (70) on the lower face when the additional airfoil (70) is in the retracted state, characterized in that

the slot-varying apparatus (76) is designed to be elastically flexible at least in places in the profile chord direction of the wing or that the slot-varying apparatus (76) has flexibly variable curvature.

11. The wing as claimed in claim 10, characterized in that the front end of the slot-varying apparatus (76) in the profile chord direction is fixed to the mainplane (20).

12. The wing as claimed in claim 10 or 11, characterized in that, the front end of the slot-varying apparatus (76) in its profile chord direction is mounted such that it can rotate with respect to the mainplane (20) about the span direction and has a curved part (78a) which forms the curved transition from the lower face (23) to the rear-face area (23) of the mainplane (20) when the additional airfoil (70) is extended, and at its rear end in the profile chord direction, has an extended part (78b) which at least partially covers the slot area (79) between the mainplane (20) and the additional airfoil (70) on the lower face when the additional airfoil (70) is in the retracted state.

13. The wing as claimed in one of claims 10 to 12, characterized in that, the slot-varying apparatus (76) can be varied between the curved configuration and the extended configuration by aerodynamic forces acting between the mainplane (20) and the additional airfoil (10).

14. The wing as claimed in one of claims 10 to 12, characterized in that, the slot-varying apparatus (76) can be varied between the curved configuration and the extended configuration by means of a drive device which is coupled to the slot-varying apparatus.

15. The wing as claimed in claim 14, characterized in that the drive device is arranged in the slot-varying apparatus (76).

16. The wing as claimed in claim 15, characterized in that the drive device is arranged in the curved part (78b) of the slot-varying apparatus (76) which forms the curved transition from the lower face (23) to the rear-face area (25) of the mainplane (20).

17. The wing as claimed in claim 14, 15 or 16, characterized in that the drive device is kinematically coupled to the movement of the additional airfoil (70) with respect to the mainplane (20) in the sense of positive movement of the slot-varying apparatus (76) during extension and retraction of the additional airfoil (70).

18. The wing as claimed in claim 17, characterized in that the drive device is kinematically coupled to a rail by means of which the additional airfoil (70) is articulated on the mainplane (20).

19. The wing as claimed in one of claims 1 to 18, characterized in that the operating device (4) is provided for operating the slot opening and closing device (16; 26; 36; 46) comprising a control device (6) which is used to open the slot (9) through which flow passes, as a function of the angle of attack or speed, or as a function of a parameter which is equivalent to the angle of attack or the speed.

20. The wing as claimed in one of claims 1 to 19, characterized in that the flap is a wing leading-edge slat.

21. The wing as claimed in one of claims 1 to 19, characterized in that the high-lift flap is a wing trailing-edge flap.

21. The wing as claimed in one of claims 1 to 20, characterized in that the wing comprises an operating device (4) with a control device (6) and actuation devices (5a, 5b), wherein the control device (6) is connected by a first command line (8a) to a first actuation device (5a) for driving a flap (2) and with a second command line (8b) to a second actuation device (5b) for driving a slot opening and closing device, the control device (6) comprising a function for generating a signal for actuation

of the first actuation device (5a) and for generating a signal for actuation of the second actuation device (5b).

22. The wing as claimed in claim 21, characterized in that the actuation command function comprises an input module for receiving operational data from an aircraft system device, and in that the command function comprises a function which, based on these input data, calculates positions of the flap and of the slot opening and closing device for transmitting the same to the first actuation device (5a) and to the second actuation device (5b).

23. The wing as claimed in claim 22, characterized in that the operational data define a flight state or an operational aircraft system mode.

24. The wing as claimed in claim 23, characterized in that the operational data comprise altitude, aircraft position and/or speed.

25. The wing as claimed in claim 23 or 24, characterized in that the operational data comprise aircraft safety data.

26. The wing as claimed in one of claims 24 to 25, characterized in that the operational data comprise the command to bring the second actuation device (5b) in a closed or open position.

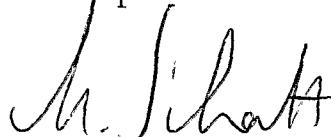
27. The wing as claimed in one of claims 21 to 26, characterized

- in that the operating device comprises a table in which pre-defined operational data are set in relation to nominal positions of the flap and/or of the slot opening and closing device,
- in that the operating device comprises a comparison function by which, based on received operational data positions of the flap and/or of the slot opening and closing device are identified which are to be commanded, and which comprises a function to transmit the positions to the command device for transmittal to the flap and/or of the slot opening and closing device or a function to transmit the positions to the flap and/or of the slot opening and closing device.

STATEMENT UNDER ARTICLE 19 (1)

According to item 2 of the opinion of the international search report the features of original claims 2 and 3 have been included in original claim 1 and the features of original claims 13 and 14 have been included in original claim 12, which results in independent claims 1 and 10. These newly filed independent claims 1 and 10 have been divided in a two-part form, with the first portion reflecting the nearest prior art disclosed respectively by documents D1 (DE 14 81 578 A1) and D2 (GB-A-2 096 551).

The subject-matters of newly filed claims are considered as being new and inventive in the light of the cited prior art.



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