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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 October 2009 (22.10.2009)

PCT

(10) International Publication Number
WO 2009/127258 A3

(51) International Patent Classification:
E01F 8/00 (2006.01)

(21) International Application Number:
PCT/EP2008/054668

(22) International Filing Date:
17 April 2008 (17.04.2008)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant *(for all designated States except US)*: **STICHTING NATIONAAL LUCHT- EN RUIMTE-VAART LABORATORIUM** [NL/NL]; Anthony Fokkerweg 2, NL-1059 CM Amsterdam (NL).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **VAN VEEN, Theo, Antoon** [NL/NL]; Helsingborg 47, NL-3124 TD Schiedam (NL).

(74) Agents: **VONCKEN, Bartholomeus Maria Christiaan** et al.; Overschiestraat 180, NL-1062 XK Amsterdam (NL).

(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).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
18 November 2010

WO 2009/127258 A3

(54) Title: METHOD FOR THE REDUCTION OF SOUND

(57) Abstract: A method for the reduction of sound travelling in a wave-guide in the air above the ground is presented, comprising the provision below the ground of at least a top layer which, at the interface of the top layer and air, has an acoustic impedance which substantially matches the acoustic impedance of the air. Also a cylindrical structure with holes can be used. The method may be used for the reduction of aircraft sounds, especially in the range of 15 Hz to 40 Hz, during the first part of take-off, wherein said layer (s) below the ground are provided in a range starting at a lateral side of the runway and extending until at least 100 meters, preferably until at least 300 meters and more preferably until at least 500 meters, from the runway.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/054668

A. CLASSIFICATION OF SUBJECT MATTER
INV. E01F8/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E01F E21D E04B B64F G10K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 244 439 A (WESTED JENS) 13 January 1981 (1981-01-13)	1-6, 8-11, 14-16
Y	* abstract; figures 1-5 column 1, lines 12-18,45-66 column 2, lines 19-52 column 6, lines 32-43 column 7, lines 3-15 column 9, line 65 - column 10, line 3	7,12,13
X	GB 2 351 770 A (CULLUM DETUNERS LTD [GB]) 10 January 2001 (2001-01-10) * abstract; figure 6 page 8, line 5 - page 9, line 16	1

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 September 2010	16/09/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	de Jong, Frank

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/054668

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 502 016 A (OLSON HARRY F) 28 March 1950 (1950-03-28) figures 1,3 column 1, lines 10-20 column 6, lines 4-35	1
Y	JP 55 009971 A (SEKISUI PLASTICS) 24 January 1980 (1980-01-24) * abstract; figures 1,3	7
A	WO 2004/013427 A1 (TOYOTA MOTOR CO LTD [JP]; NISHIMURA YASUHIKO [JP]) 12 February 2004 (2004-02-12) * abstract; figures 6B, 9A, 11B, 12B page 6, lines 6-10 page 7, lines 7-12 page 12, lines 5-11	10
A	US 2001/030079 A1 (RYAN JAMES G [CA] ET AL) 18 October 2001 (2001-10-18) * abstract; figures 1,4,6 paragraphs [0002] - [0004], [0025], [0058]	4,10
A	US 2005/194205 A1 (GUO YUEPING [US]) 8 September 2005 (2005-09-08) * abstract; figure 1 paragraphs [0006], [0029]	1
Y	DE 28 34 683 B1 (WELTIN OPTAC [DE]) 31 October 1979 (1979-10-31) the whole document	12,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2008/054668

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4244439 A	13-01-1981	DE 2848597 A1	17-05-1979
		DK 345278 A	05-02-1980
		FR 2408888 A1	08-06-1979
		GB 2010944 A	04-07-1979
		IT 1108395 B	09-12-1985
		JP 1359937 C	30-01-1987
		JP 54099401 A	06-08-1979
		JP 61025159 B	14-06-1986
		LU 80501 A1	05-06-1980
		NL 7811154 A	14-05-1979
		NO 783774 A	11-05-1979
		SE 440101 B	15-07-1985
		SE 7811467 A	11-05-1979
GB 2351770 A	10-01-2001	NONE	
US 2502016 A	28-03-1950	NONE	
JP 55009971 A	24-01-1980	NONE	
WO 2004013427 A1	12-02-2004	CN 1678801 A	05-10-2005
		EP 1525356 A1	27-04-2005
		JP 2004062074 A	26-02-2004
		US 2005263346 A1	01-12-2005
US 2001030079 A1	18-10-2001	NONE	
US 2005194205 A1	08-09-2005	NONE	
DE 2834683 B1	31-10-1979	NONE	