



(43) International Publication Date  
10 August 2017 (10.08.2017)

(51) International Patent Classification:  
A47L 15/42 (2006.01)

(21) International Application Number:  
PCT/IB2017/050328

(22) International Filing Date:  
23 January 2017 (23.01.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
P-201600031 1 February 2016 (01.02.2016) SI

(71) Applicant: GORENJE GOSPODINJSKI APARATI,  
D.D. [SI/SI]; Partizanska 12, 3503 Velenje (SI).

(72) Inventors: SAHLÉN, Anders Karl; Jon-Jespersgatan 51,  
467 30 Grästorps (SE). ÅRLID, Christian Peter Daniel;  
Maratongatan 26, 531 52 Lidköping (SE).

(74) Agent: INVENTIO D.O.O.; Dolenjska cesta 11, 1000  
Ljubljana (SI).

(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, BN, BR, BW, BY,  
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM,  
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,  
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN,  
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA,  
MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG,  
NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS,  
RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY,  
TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,  
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,  
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,  
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,  
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,  
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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

(54) Title: A DISHWASHING APPLIANCE WITH A DEVICE FOR RETAINING AND OPENING DOOR

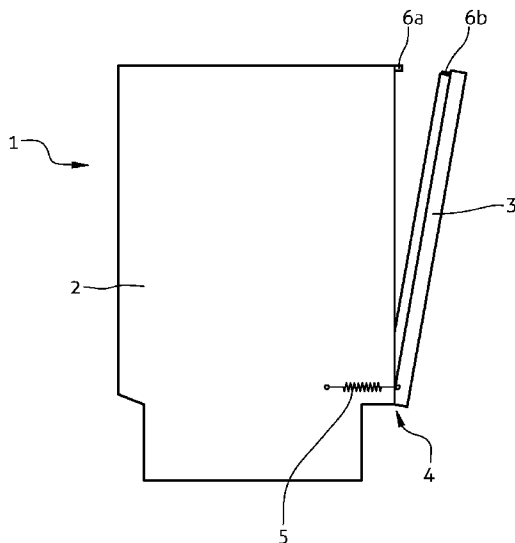


Fig. 1

(57) Abstract: The present invention refers to a dishwashing appliance, comprising a cabinet with a compartment to receive articles to be washed and a door used to close said compartment, said cabinet and said door being provided with a device for retaining and automatic opening of the door. It is provided for according to the present invention that a device (6a; 6b) for retaining and automatic door (3) opening comprises a latch (6a) which is arranged on and, respectively, in a cabinet (2) at the side opposite to hinges (4) of the door (3), and a retaining element (6b) which is arranged in the door (3) in order to cooperate with said latch (6a), wherein an actuator (15) arranged in the door (3) drives said retaining element (6b).

WO 2017/134539 A1

**A DISHWASHING APPLIANCE WITH A DEVICE FOR RETAINING AND OPENING DOOR**

**[0001]** The present invention refers to a dishwashing appliance, comprising a cabinet with a compartment to receive articles to be washed and a door used to close said compartment, said cabinet and said door being provided with a device for retaining and automatic opening of the door.

**[0002]** The purpose of an automatic door opening system with a dishwashing appliance is primarily to reduce the energy consumption as the temperature of the final rinse can be lowered. During the drying phase of the program cycle the drying time can be shortened and the drying performance improved by automatic door opening. Various solutions of automatic door opening are known, which comprise either a directly actuator driven device that pushes the door to an open ventilation position, either comprise an actuator that releases a door latch by shifting hooks thereof and the door is then moved to a ventilation position by means of a spring system. Both solutions require a rather powerful actuator or an actuator driven device with a large gear ratio in order to overcome the retaining force of the door latch.

**[0003]** It is the object of the present invention to create a dishwashing appliance with a device for retaining and automatic opening of the door, which remedies drawbacks of the known solutions.

**[0004]** The object as set above is solved, according to the present invention, by features according to the characterising clause of the claim 1. The invention is disclosed in detail in corresponding subclaims.

**[0005]** The invention is further described in detail by way of non-limiting embodiment, and with a reference to the accompanying drawings, where

Fig. 1 shows a simplified view of a dishwashing appliance;

Fig. 2a, 2b, 2c shows a door latch in a view from above, in various positions during closing

the door;

Fig. 3 shows a front cross-sectional view of a door in a locked position;

Fig. 4 shows a front cross-sectional view of a door in an unlocked position.

**[0006]** A dishwashing appliance 1 comprises a cabinet 2 with a compartment to receive articles to be washed, and a door 3 to close said compartment. In the present embodiment, the door 3 is articulated in the lower area of the body 2 by means of hinges 4. Furthermore, in said lower area of the body 2 there is arranged a resilient means 5 connected to the door 3, said resilient means 5 continuously acts on the door 3 so that it tries to force the door 3 in the open position. Said body 2 and the door 3 are provided with a device 6a; 6b for retaining and automatic opening of the door 3. Said device for retaining and automatic opening of the door 3 comprises a latch 6a that is arranged on and, respectively, in the body 2 preferably at the end opposite to said hinges 4, and a retaining element 6b that is preferably arranged in the door 3 in order to cooperate with the latch 6a. However, an embodiment of the device 6a; 6b for retaining and automatic opening of the door 3 is possible, where the latch 6a is arranged in the door 3 and the retaining element 6b is arranged on and, respectively, in the body 2 of the dishwashing appliance 1.

**[0007]** Said latch 6a is known per se and comprises a pair of holders 7, 8 extending approximately in parallel and lying approximately in a horizontal plane, each first end of said holders 7, 8 cooperating with the retaining element 6b is formed with a hook 7', 8', whereas each opposite end of the holders 7, 8 is connected with a resilient means 9 which forces said hooks 7', 8' towards each other in said horizontal plane. Said hooks 7', 8' face each other and are formed in a manner that they are movable against each other and in the direction.

**[0008]** With the preferred embodiment, said retaining element 6b is arranged in the door 3 opposite to said latch 6a and is movable in the vertical plane i.e. approximately perpendicularly to the plane in which said holders 7, 8 rest and operate. The door 3 comprises a cavity 11 in which a body 12 of the retaining element 6b is arranged with a waterproof fit and movable along the height of the door 3. A retaining section 14 is attached to the end of said body 12 which faces the upper edge 10 of the door, said retaining section 14

protruding through an associated opening 13 in said edge 10 of the door and is configured to cooperate with said hooks 7', 8' of the holders 7, 8 of the latch 6a. Said opening 13 is preferably formed in the dry area of the upper edge 10 of the door 3. Water that would potentially penetrate the gap between said opening 13 and the retaining section 14 is redirected away from all electrical parts. Said redirection is achieved by means of drainage channels formed on the retaining section 14 and similar. In general, however, the fit between the retaining element 6b and the door 3 is formed in a manner of a labyrinth sealing.

**[0009]** Furthermore, the retaining section 14 of the retaining element 6b is formed in a manner that the height thereof approximately equals the thickness of the hooks 7', 8' and that the transversal measurement thereof, i.e. the measurement in the direction which usually denotes the width of the dishwashing appliance 1, is greater than the spacing between the hooks 7', 8' of the latch 6a. According to the preferred embodiment, it is provided for that the retaining section 14 is formed as a prism the base thereof resembles an approximate form of a rhombus, thereby facilitating an engagement with the hooks 7', 8'. Therefore, when closing the door 3, the hooks 7', 8' effortlessly slides over oblique sides of the retaining section 14 and, respectively, of the prism, either when closing or opening the door 3. When hooks 7', 8' engages and, respectively, disengages with the retaining section 14 they slides over the sides of said prism, whereby said hooks 7', 8' execute mutual back and forth movement approximately in the horizontal plane as the dishwashing appliance 1 is located.

**[0100]** The latch 6a and the retaining element 6b can be formed in a manner that the faces thereof which cooperate during opening and, respectively, closing the door 3 are either vertical or inclined. In the latter case, even easier disengagement of the retaining section 14 and the hooks 7', 8' can be achieved.

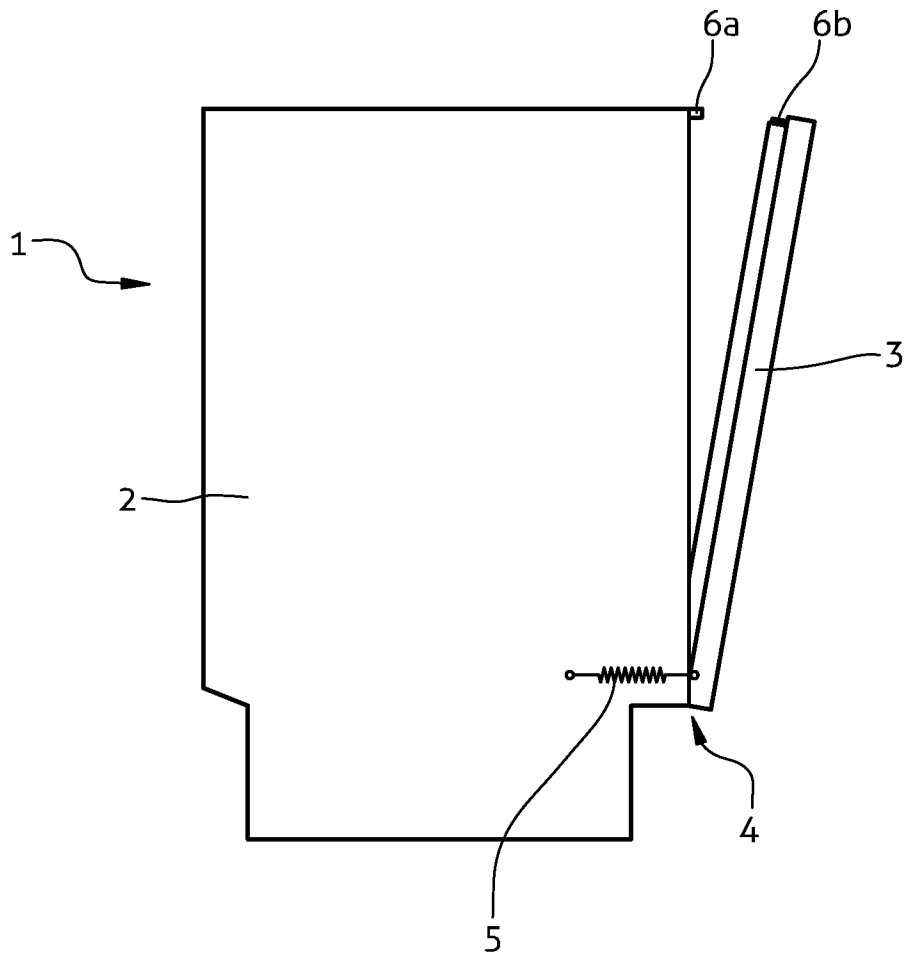
**[0011]** The retaining element 6b is connected at the side opposite to the retaining section 14 with an actuator 15. Said actuator 15 which is fixed in said cavity 11 is preferably selected as a linear actuator, i.e. an actuator executing a linear motion, such as solenoid, a wax actuator and similar. Generally, the retaining element 6b is located in a locked position, meaning that the retaining section 14 protrudes out of the opening 13 over the door edge 10

for the amount which equals the vertical measurement and, respectively, the thickness of the holders 7, 8 and, respectively, the hooks 7', 8'. When closing the door 3, the retaining section 14 slides between the hooks 7', 8' which to this end open and embrace said retaining section, thus, holding the door 3 in the closed position. When the process of washing the articles in the dishwashing appliance 1 ends, said actuator 15 is released by means of a control unit, acting on the retaining section 14 in a manner to pull it through the opening 13 inside the door 3 until it is approximately aligned with said door edge 10 and, respectively, until disengagement with the hooks 7', 8' is completed. Afterwards, said resilient means 5 pushed the door 3 into the open position, and said actuator 15 pushes the retaining section 14 back into the start position. It is obvious, that the functioning of the actuator can be switched off, so that the user of a dishwashing appliance manually handles the door.

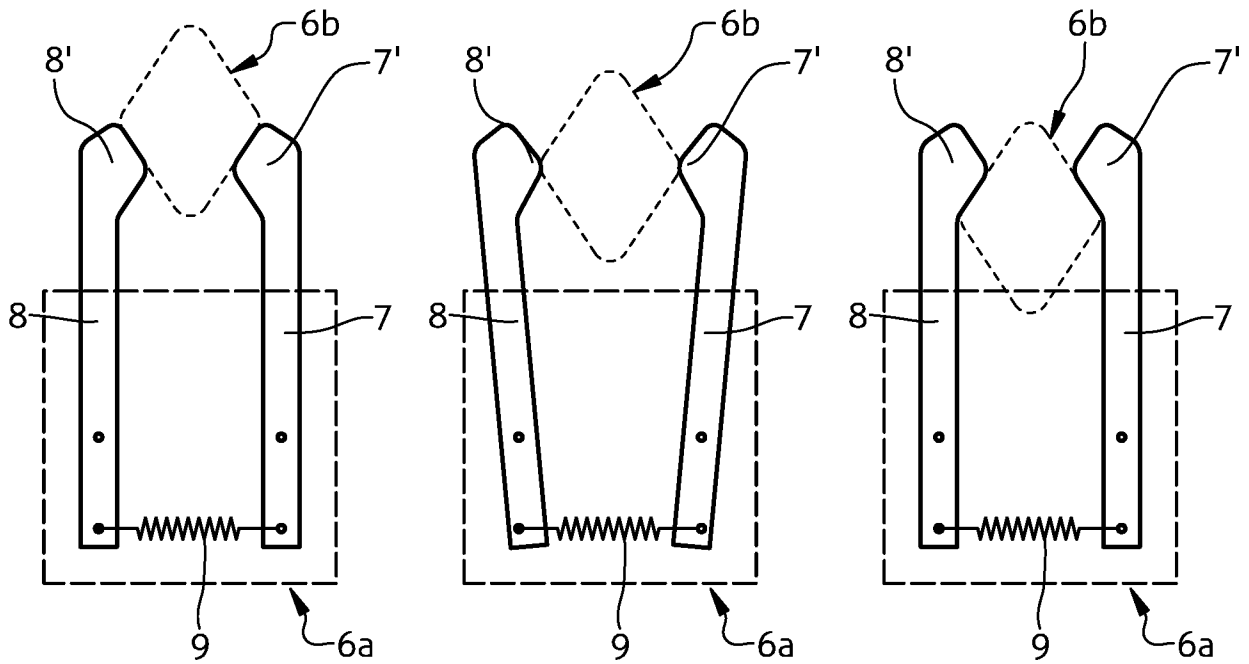
## Claims

1. A dishwashing appliance, comprising a cabinet with a compartment to receive articles to be washed and a door used to close said compartment, said cabinet and said door being provided with a device for retaining and automatic opening of the door, **characterized in that** a device (6a; 6b) for retaining and automatic door (3) opening comprises a latch (6a) which is arranged on and, respectively, in a cabinet (2) at the side opposite to hinges (4) of the door (3), and a retaining element (6b) which is arranged in the door (3) in order to cooperate with said latch (6a), wherein an actuator (15) arranged in the door (3) drives said retaining element (6b).
2. A dishwashing appliance according to claim 1, **characterized in that** said retaining element (6b) is movable in a vertical plane i.e. approximately perpendicularly to the plane in which said holders (7, 8) rest and operate.
3. A dishwashing appliance according to claims 1 and 2, **characterized in that** said latch (6a) comprises a pair of holders (7, 8) lying approximately in a horizontal plane, wherein each end thereof that cooperates with said retaining element (6b) is provided with a hook (7', 8'), whereas each opposite end of the holders (7, 8) is connected by means of a resilient means (9).
4. A dishwashing appliance according to claims 1 to 3, **characterized in that** said retaining element (6b) comprises a body (12) arranged in a cavity (11) of the door (3), a retaining section (14) is attached to the end of the body (12) facing the upper edge (10) of the door (3), said retaining section (14) protrudes through an associated opening (13) in said edge (10) of the door (3) and is provided for cooperation with said hooks (7', 8') of the holders (7, 8) of the latch (6a).
5. A dishwashing appliance according to any of the preceding claims, **characterized in that** a watertight fit is provided between said body (12) of the retaining element (6b) and the cavity (11).

6. A dishwashing appliance according to any of the preceding claims, ***characterized in that*** the retaining section (14) is formed with drainage channels in order to redirect water that would penetrate the gap between the opening (13) and the retaining section (14).
  
7. A dishwashing appliance according to any of the preceding claims, ***characterized in that*** said actuator (15) is selected as a linear actuator, such as a solenoid, a wax actuator and similar.



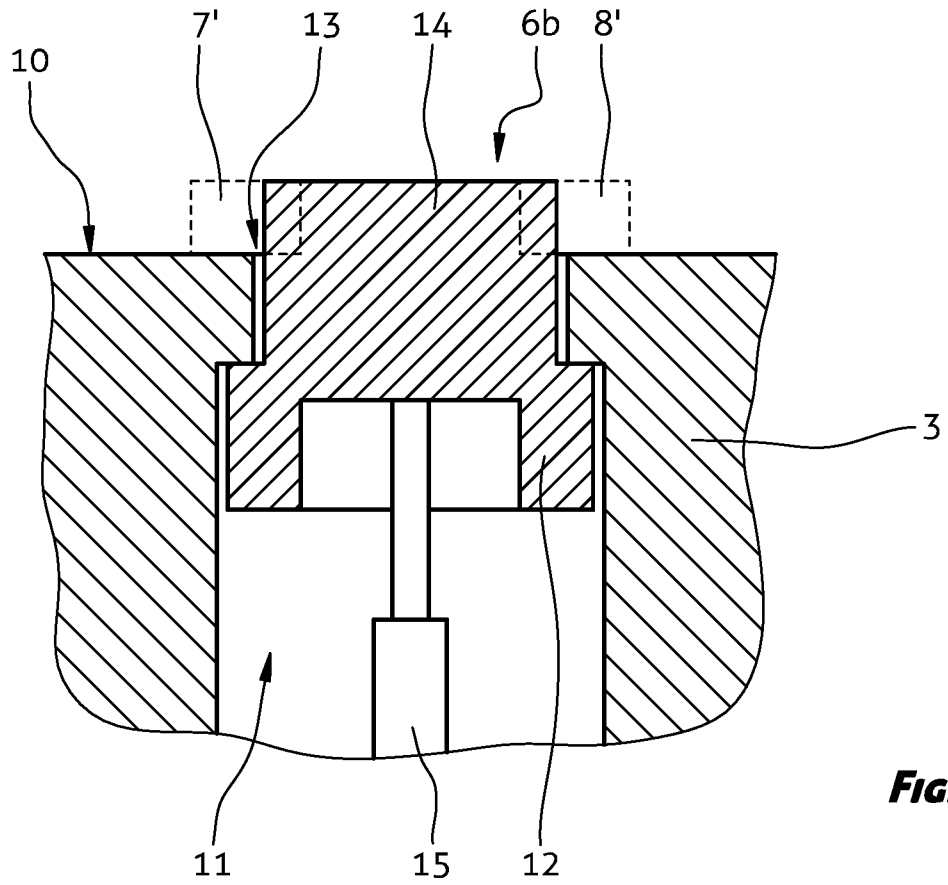
**FIG. 1**



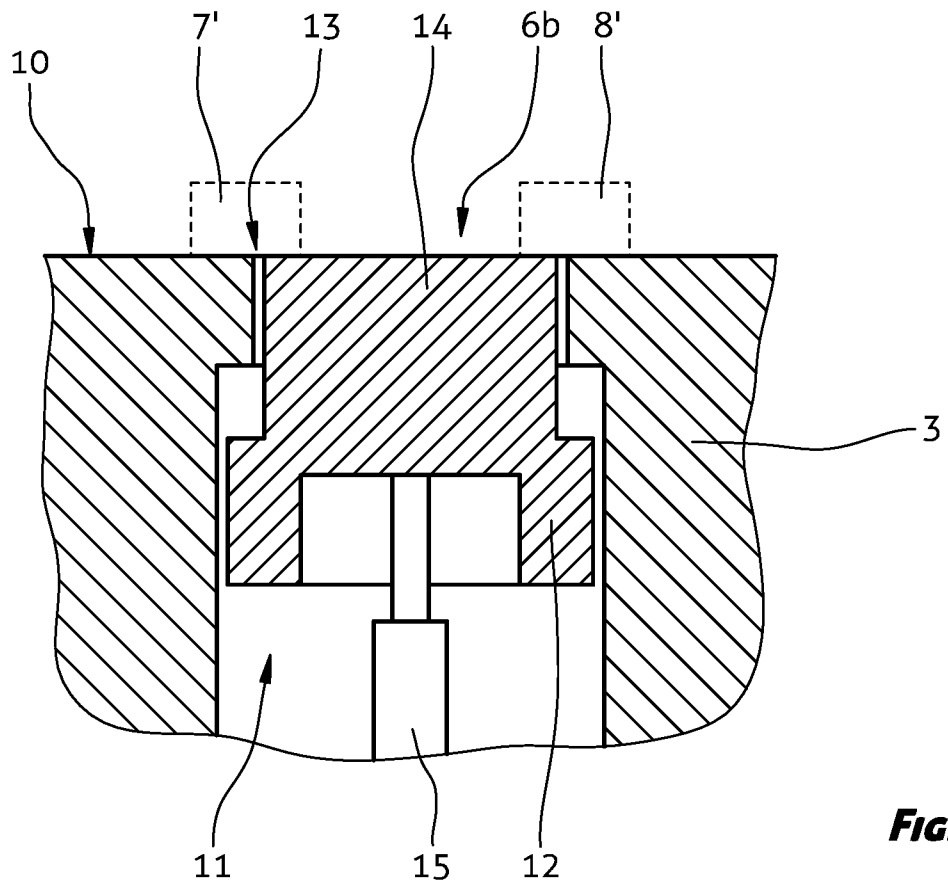
**FIG. 2a**

**FIG. 2b**

**FIG. 2c**



**FIG. 3**



**FIG. 4**

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/IB2017/050328

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. A47L15/42  
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)  
A47L

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 practicable, 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	EP 1 935 313 A1 (BONFERRARO SPA [IT]) 25 June 2008 (2008-06-25)	1,7
A	the whole document	2-6
A	----- DE 10 2011 003818 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 9 August 2012 (2012-08-09) paragraph [0004] - paragraph [0005] paragraph [0018] - paragraph [0022]	1-7
A	----- US 2 594 582 A (QUINN BERT A) 29 April 1952 (1952-04-29) column 1, line 1 - column 4, line 35 -----	1-7

Further documents are listed in the continuation of Box C.

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 application or patent 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  17 March 2017	Date of mailing of the international search report  28/03/2017
--	--

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

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2017/050328

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1935313	A1	25-06-2008	AT 444701 T 15-10-2009
			EP 1935313 A1 25-06-2008
			ES 2333608 T3 24-02-2010
-----			
DE 102011003818	A1	09-08-2012	NONE
-----			
US 2594582	A	29-04-1952	NONE
-----			