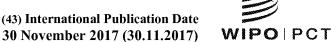
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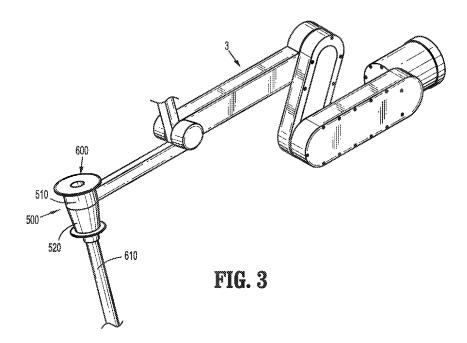
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(54) Title: CANNULA ASSEMBLIES FOR USE WITH ROBOTIC SURGICAL SYSTEMS



(57) Abstract: The present disclosure relates to cannula assemblies for use with robotic surgical systems. According to an aspect of the present disclosure, a surgical cannula assembly for use with a mounting structure of a robotic arm, is provided. The surgical cannula assembly includes a cannula configured for reception of a surgical instrument at least partially therethrough; an attachment mechanism configured to releasably engage the cannula; and a barrier configured to extend through a channel of the mounting structure. The barrier includes a proximal ring for positioning adjacent a proximal face of the mounting structure, a distal ring for positioning adjacent a distal face of the mounting structure, and a cylindrical section defining a lumen therein and extending between the proximal ring and the distal ring, the cannula configured for insertion within the lumen in a distal -to-proximal direction.

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).

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CANNULA ASSEMBLIES FOR USE WITH ROBOTIC SURGICAL SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit of and priority to U.S. Provisional Patent Application Serial No. 62/341,888, filed on May 26, 2016, the entire contents of which being hereby incorporated by reference in its entirety.

BACKGROUND

[0002] Robotic surgical systems have been used in minimally invasive medical procedures. Some robotic surgical systems include a console supporting a robot arm, and at least one elongated surgical instrument including an end effector such as a forceps or a grasping tool that is mounted to the robot arm via a wrist assembly. During a medical procedure, part of the elongated surgical instrument (e.g., the end effector) is typically inserted into a small incision (via a cannula assembly) or a natural orifice of a patient to position the end effector at a work site within the body of the patient. Moreover, robotic surgical systems may include a first robot arm and mounting structure for supporting an elongated surgical instrument, and at least a second robot arm and mounting structure for supporting a cannula assembly.

[0003] Cables extend from the robot console, through the robot arm, and connect to the wrist assembly and/or end effector. In some instances, the cables are actuated by means of motors that are controlled by a processing system including a user interface for a surgeon or clinician to be able to control the robotic surgical system including the robot arm, the mounting structure and/or the end effector.

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It is often desired to re-use parts of the robotic system. As such, it may be important to ensure the sterility of such re-usable components of the robotic system. Accordingly, there is a need to provide a sterile barrier between a cannula of the cannula assembly and the mounting structure associated therewith. It may also be desirable to have the ability to load the cannula into the associated mounting structure in a distal-to-proximal direction to avoid awkwardly lifting the cannula and loading it proximally-to-distally through the mounting structure.

SUMMARY

The present disclosure relates to cannula assemblies for use with robotic surgical systems. According to an aspect of the present disclosure, a surgical cannula assembly for use with a mounting structure of a robotic arm, is provided. The surgical cannula assembly includes a cannula configured for reception of a surgical instrument at least partially therethrough; an attachment mechanism configured to releasably engage the cannula; and a barrier configured to extend through a channel of the mounting structure. The barrier includes a proximal ring for positioning adjacent a proximal face of the mounting structure, a distal ring for positioning adjacent a distal face of the mounting structure, and a cylindrical section defining a lumen therein and extending between the proximal ring and the distal ring, the cannula configured for insertion within the lumen in a distal-to-proximal direction.

[0006] The barrier may be configured to provide a sterile barrier between the cannula and the mounting structure during use.

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[0007] The surgical cannula assembly may further include a first seal disposed within the lumen of the barrier and being configured to provide an air-tight seal about a surgical instrument that is inserted through a hole defined by the first seal.

[0008] The surgical cannula assembly may further include a second seal disposed within the lumen of the barrier and being configured to provide an air-tight seal within the lumen of the barrier in the absence of a surgical instrument within the lumen of the barrier.

[0009] The first seal and the second seal may be made from the same material as the barrier.

[00010] The cannula may be configured for removal from the lumen of the barrier in a proximal-to-distal direction.

[00011] The cannula may be configured for removal from the lumen in a distal-to-proximal direction.

[00012] According to a further aspect of the present disclosure, a method of engaging a cannula with a mounting structure of a robotic arm is provided. The method includes inserting a portion of a cannula within a channel of the mounting structure in a distal-to-proximal direction, the cannula providing a path through which a surgical instrument can be inserted in a proximal-to-distal direction at least partially therethrough to access a patient.

[00013] The method may further include removing the cannula from engagement with the mounting structure in a proximal-to-distal direction.

[00014] The method may also include inserting a barrier at least partially within the channel of the mounting structure.

[00015] The method may further include engaging an attachment member with the barrier, and removably securing the attachment member to the cannula.

[00016] The method may also include removing the cannula from engagement with the mounting structure in a distal-to-proximal direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[00017] Embodiments of the present disclosure are described herein with reference to the accompanying drawings, wherein:

[00018] FIG. 1A is a schematic illustration of a medical work station and operating console in accordance with the present disclosure;

[00019] FIG. 1B is a schematic, perspective view of a motor of a control device of the medical work station of FIG. 1A;

[00020] FIG. 2 is a perspective view of an arm of the medical work station of FIGS. 1A and 1B including a mounting structure thereon;

[00021] FIG. 3 is a perspective view of the arm and mounting structure of FIG. 2 including a cannula assembly extending through the mounting structure;

[00022] FIG. 4 is a perspective view of the mounting structure and cannula assembly of FIG. 3; and

[00023] FIG. 5 is a cross-sectional view of the mounting structure and cannula assembly of FIGS. 3 and 4.

DETAILED DESCRIPTION

[00024] Embodiments of the presently disclosed robotic surgical systems and cannula assemblies are described in detail with reference to the drawings, in which like reference numerals designate identical or corresponding elements in each of the several views. As used herein the term "distal" refers to that portion of the system or assembly that is farther from the user, while the term "proximal" refers to that portion of the system or assembly that is closer to the user.

[00025] Referring initially to FIGS. 1A and 1B, a medical work station is shown generally as work station 1 and generally includes a plurality of robot arms 2, 3; a control device 4; and an operating console 5 coupled with control device 4. Operating console 5 includes a display device 6, which is set up in particular to display three-dimensional images; and manual input devices 7, 8, by means of which a person (not shown), for example a surgeon, is able to telemanipulate robot arms 2, 3 in a first operating mode, as known in principle to a person skilled in the art.

[00026] Each of the robot arms 2, 3 includes a plurality of members, which are connected through joints, and an instrument control unit 100 or a mounting structure 500. Instrument control unit 100 may be attached, for example, to a surgical instrument 10 having an instrument drive assembly 200, and supporting an end effector 20 having jaw members. Mounting structure 500 may be configured to slidingly accept, for example, a cannula assembly 600, as will be described in greater detail below.

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[00027] Robot arms 2, 3 may be driven by electric drives (not shown) that are connected to control device 4. Control device 4 (e.g., a computer) is set up to activate the drives, in particular by means of a computer program, in such a way that robot arms 2, 3, instrument control units 100 (and thus the surgical instruments 10), and mounting structure 500 (and thus the cannula assembly 600) execute a desired movement according to a movement defined by means of manual input devices 7, 8. Control device 4 may also be set up in such a way that it regulates the movement of robot arms 2, 3 and/or of the drives.

Medical work station 1 is configured for use on a patient 13 lying on a patient table 12 to be treated in a minimally invasive manner by means of surgical instrument 10. Medical work station 1 may also include more than two robot arms 2, 3, the additional robot arms likewise being connected to control device 4 and being telemanipulatable by means of operating console 5. An instrument control unit, a surgical instrument, a mounting structure and/or a cannula assembly may also be attached or coupled to the additional robot arms. Medical work station 1 may include a database 14, in particular coupled to with control device 4, in which are stored for example pre-operative data from patient 13 and/or anatomical atlases.

[00029] Reference may be made to U.S. Patent No. 8,828,023, entitled "Medical Workstation," the entire content of which is incorporated herein by reference, for a detailed discussion of the construction and operation of medical work station 1.

[00030] Control device 4 may control a plurality of motors (e.g., "M1" – "M6"). Motors may be part of instrument control unit 100 and/or disposed externally of instrument control unit 100. Motors "M" (e.g., motors "M" being located externally of instrument control unit 100) may be configured to rotate a crown gear "CG" (FIG. 1B), or the like, that is keyed to or non-

rotatably supported on a rotatable shaft of at least some of motors "M." In use, as motors "M" are driven, the rotation of crown gear(s) "CG" effects operation and/or movement of instrument drive assembly 200 of surgical instrument 10, as discussed below. It is further envisioned that at least one motor "M" receives signals wirelessly (e.g., from control device 4). It is contemplated that control device 4 coordinates the activation of the various motors (Motor 1...n) to coordinate an operation and/or movement of surgical instrument 10 and/or cannula assembly 600. It is envisioned that each motor corresponds to a separate degree of freedom of surgical instrument 10 engaged with instrument control unit 100. It is further envisioned that more than one motor, including every motor (Motor 1...n), is used for each degree of freedom. Reference may be made to commonly owned International Patent Publication No. WO 2015/088647, filed on October 20, 2014, entitled "Wrist and Jaw Assemblies for Robotic Surgical Systems," the entire content of which is incorporated herein by reference, for a detailed discussion of illustrative examples of the construction and operation of end effectors 20 for use with instrument control unit 100.

Turning now to FIGS. 2-3, robot arm 3 is shown supporting mounting structure 500. It is envisioned that mounting structure 500 is removably or fixedly coupled to robot arm 3. It is further envisioned that a portion (e.g., a proximal housing 510) of mounting structure 500 is rotatable with respect to another portion (e.g., a distal housing 520) of mounting structure 500, such that at least a portion of mounting structure 500 is rotatable with respect to robot arm 3. As discussed in further detail below, mounting structure 500 is configured to accept cannula assembly 600 at least partially therein. For example, at least a portion of cannula assembly 600 may be inserted through a channel 530 extending through mounting structure 500 in the general direction of arrow "A" in FIG. 3, from a distal direction toward a proximal direction.

[00032] Additionally, a conventional access port is usable with cannula assembly 600 (e.g., in embodiments using medical work station 10 in FIG. 1A). In such uses, alignment between the robotic arm 3 and the access port is maintained, thereby removing the need to simultaneously align the surgical instrument 10 with the robot arm 3 and align the surgical instrument 10 with the access port.

[00033] Referring to FIGS. 4 and 5, cannula assembly 600 is shown extending through mounting structure 500. Cannula assembly 600 includes a cannula or trocar 610, an attachment member 620, a barrier 630, a first seal 640, and a second seal 650. Generally, cannula assembly 600 is configured to provide a passageway for a surgical instrument (e.g., surgical instrument 10) to be inserted through an incision in a patient's skin and adjacent target tissue. Additionally, as discussed in further detail below, cannula assembly 600 is configured to minimize or prevent gasses and/or fluids from exiting the patient proximally through cannula assembly 600, for example.

Cannula 610 is an elongated, hollow tube that is configured to allow an elongated portion and an end effector of a surgical instrument to pass therethrough and access target tissue within a patient, for example. Cannula 610 is sized and dimensioned for insertion within a channel 530 of mounting structure 500. More particularly, cannula 610 is configured to be inserted into channel 530 of mounting structure 500 in a distal-to-proximal direction (in the general direction of arrow "B" in FIG. 5), and cannula 610 may be removed from channel 530 in a proximal-to-distal direction (in the general direction of arrow "C" in FIG. 5). An outer diameter of cannula 610 and an inner diameter of barrier 630 (e.g., a distal cylindrical section 636) within channel 530 of mounting structure 500 may be similarly sized to enable a frictional engagement therebetween.

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With continued reference to FIGS. 4 and 5, attachment member 620 is a ring-like, [00035] cylindrical tube including a longitudinal cavity 622 extending therethrough, and including a proximal recess 624 therein. As shown in FIG. 5, cannula 610 is sized and dimensioned to extend through longitudinal cavity 622 of attachment member 620. More particularly, the present disclosure envisions that cannula 610 is fixedly attached to attachment member 620, is frictionally engaged with attachment member 620, or is mechanically fastened or able to be fastened to attachment member 620. For instance, it is envisioned that attachment member 620 engages cannula 610 with mechanical structure such as a set screw 629 (as shown in FIG. 5). break-away snaps (not explicitly shown), ribs designed to fracture in response to a predetermined amount of force (not explicitly shown), a bayonet-type connection, etc. It is further envisioned that the engagement between attachment member 620 and cannula 610 allows cannula 610 to be removed from mounting structure 500 in a distal-to-proximal direction (in the general direction of arrow "B" in FIG. 5), such that cannula 610 can be removed from mounting structure 500 in either a distal-to-proximal direction or a proximal-to-distal direction. For instance, attachment member 620 may be removed from cannula 610, e.g., by loosening set screw 629, and cannula 610 may be forced proximally through a lumen 631 within barrier 630 and out of engagement with the patient 13.

[00036] Additionally, cannula assembly 600 may completely lack attachment member 620. In such embodiments, cannula 610 directly engages barrier 630 (e.g., a threaded connection therebetween), and a distal-to-proximal disengagement of cannula 610 with respect to barrier 630 may not be feasible.

[00037] With particular reference to FIG. 5, barrier 630 is shown. Barrier 630 may be made from poly-ethyene, nylon, polypropylene, Acetal, ABS, poly-carbonate, Poly-sulphone,

PEEK, Radel, silicon, etc., and is configured to minimize or prevent contamination of mounting structure 500, instrument control unit 100, surgical instrument 10, etc. from bodily fluids that were in contact with cannula 610 during use, for example. Barrier 630 defines lumen 631, and includes a proximal ring 632, a proximal cylindrical section 634, a distal cylindrical section 636, and a distal ring 638. Proximal ring 632 is positioned adjacent to or in contact with a proximal face 540 of mounting structure 500. Proximal cylindrical section 634 extends distally from proximal ring 632 and is positioned within channel 530 of mounting structure 500 (e.g., within channel 530 of proximal housing 510). Distal cylindrical section 636 extends distally from proximal cylindrical section 634, extends through channel 530, and extends distally of a distal face 542 of mounting structure 500. Distal ring 638 is positioned adjacent to or in contact with distal face 542 of mounting structure 500, and radially surrounds a portion of distal cylindrical section 636. Distal ring 638 may be affixed to distal cylindrical section 636 or may be longitudinally movable with respect to distal cylindrical section 636. For example, distal ring 638 may be removable from the remainder of barrier 630. As shown in FIG. 5, at least one Oring 639 may be included (e.g., integrated into barrier 630) to help ensure a secure engagement with little to no "play" between cannula 610 and barrier 630.

[00038] Further, a quick-connect mechanism may be utilized to enable or facilitate mechanical engagement between cannula 610, attachment member 620 and/or barrier 630. For example, attachment member 620 may include threads on proximal recess 624 which engage corresponding threads on distal cylindrical section 636 (e.g., the portion of distal cylindrical section 636 that extends distally of distal ring 638). A bayonet-, twist-, or snap-type connection may also be utilized between attachment member 620 and barrier 630.

[00039] With reference to FIG. 5, first seal 640 is disposed within proximal ring 632 of barrier 630. First seal 640, e.g., a septum seal or an instrument seal, is configured as a hole or opening, for instance, radially centered on proximal ring 632. First seal 640 is configured to maintain a fluid- and/or air-tight seal between areas located distally of first seal 640 and areas located proximally of first seal 640 while a surgical instrument (e.g., surgical instrument 10) extends through a hole 641 first seal 640 (e.g., to prevent or minimize the amount of insufflation gasses capable of escaping the patient during a surgical procedure). It is envisioned that first seal 640 is formed from the same material as barrier 630 (e.g., material directly adjacent hole 641 is made from the same material as barrier 630), or that first seal 640 includes a different material (e.g. disposable plastic or a reusable material) that is attached to barrier 630.

[00040] With continued reference to FIG. 5, second seal 650 is shown disposed within proximal housing 510 of mounting structure 500. Second seal 650, e.g., a duckbill seal, is radially centered within proximal cylindrical section 634 of barrier 630. Second seal 650 is configured to maintain a fluid- and/or air-tight seal between areas located distally of first seal 640 and areas located proximally of first seal 640 without the presence of a surgical instrument inserted therethrough (e.g., to prevent or minimize the amount of insufflation gasses capable of escaping the patient prior to a surgical instrument is inserted through cannula 610 and/or after a surgical instrument is removed from cannula 610). It is envisioned that second seal 650 is made from the same material as barrier 630 or from a different material.

[00041] The present disclosure also includes methods of engaging cannula 610 with mounting structure 500 of robot arm 3. For example, methods include inserting a portion of cannula 610 within mounting structure 500 in a distal-to-proximal direction. Methods also include removing the cannula 610 from engagement with mounting structure 500 in a proximal-

to-distal direction and/or a distal-to-proximal direction, inserting barrier 630 at least partially within channel 530 of mounting structure 500, engaging attachment member 620 with barrier 630, and removably securing attachment member 620 to cannula 610, for instance.

The use of cannula assembly 600 and mounting structure 500 may also enable nurses or assistants to insert the surgical instrument(s) 10 (as alignment is facilitated using mounting structure 500), while the surgeon focuses on the precise location of the end effector 20 of the surgical instrument 10 with respect to target tissue. This process may lead to faster instrument insertion, and may help prevent inadvertently contacting adjacent tissue with the end effector 20.

[00043] It will be understood that various modifications may be made to the embodiments disclosed herein. Therefore, the above description should not be construed as limiting, but merely as exemplifications of various embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended thereto.

CLAIMS:

1. A surgical cannula assembly for use with a mounting structure of a robotic arm, the surgical cannula assembly comprising:

a cannula configured for reception of a surgical instrument at least partially therethrough; an attachment mechanism configured to releasably engage the cannula; and

a barrier configured to extend through a channel of the mounting structure, the barrier including a proximal ring for positioning adjacent a proximal face of the mounting structure, a distal ring for positioning adjacent a distal face of the mounting structure, and a cylindrical section defining a lumen therein and extending between the proximal ring and the distal ring, the cannula configured for insertion within the lumen in a distal-to-proximal direction.

- 2. The surgical cannula assembly according to claim 1, wherein the barrier is configured to provide a sterile barrier between the cannula and the mounting structure during use.
- 3. The surgical cannula assembly according to claim 1, further comprising a first seal disposed within the lumen of the barrier and being configured to provide an air-tight seal about a surgical instrument that is inserted through a hole defined by the first seal.
- 4. The surgical cannula assembly according to claim 3, further comprising a second seal disposed within the lumen of the barrier and being configured to provide an air-tight seal within the lumen of the barrier in the absence of a surgical instrument within the lumen of the barrier.
- 5. The surgical cannula assembly according to claim 4, wherein the first seal and the second seal are made from the same material as the barrier.

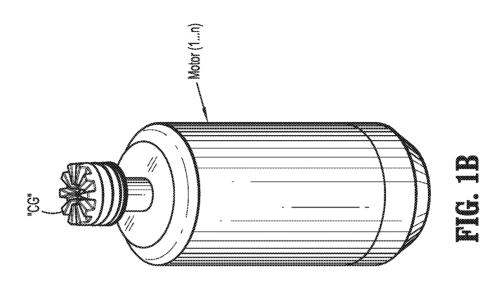
6. The surgical cannula assembly according to claim 1, wherein the cannula is configured for removal from the lumen of the barrier in a proximal-to-distal direction.

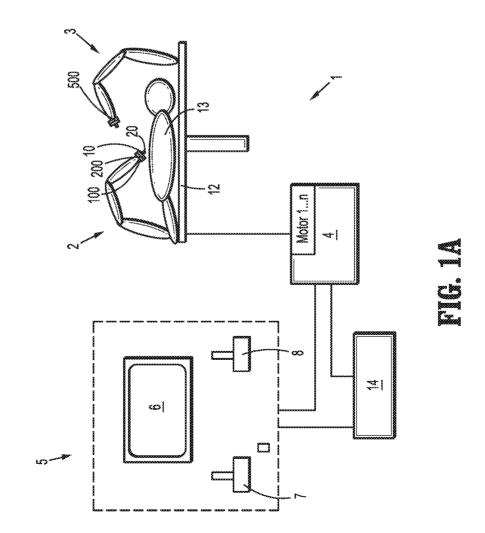
- 7. The surgical cannula assembly according to claim 6, wherein the cannula is configured for removal from the lumen in a distal-to-proximal direction.
- 8. A method of engaging a cannula with a mounting structure of a robotic arm, comprising:

inserting a portion of a cannula within a channel of the mounting structure in a distal-to-proximal direction, the cannula providing a path through which a surgical instrument can be inserted in a proximal-to-distal direction at least partially therethrough to access a patient.

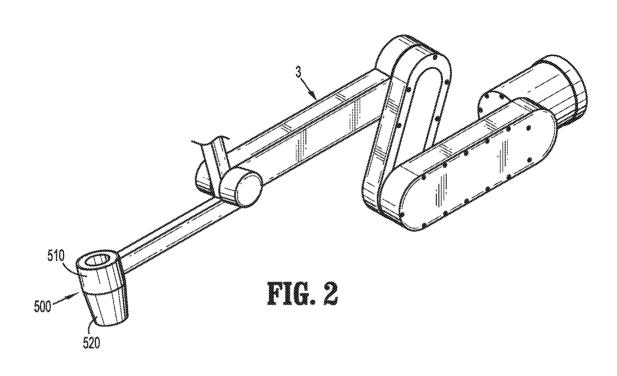
- 9. The method according to claim 8, further comprising removing the cannula from engagement with the mounting structure in a proximal-to-distal direction.
- 10. The method according to claim 8, further comprising inserting a barrier at least partially within the channel of the mounting structure.
- 11. The method according to claim 10, further comprising engaging an attachment member with the barrier, and removably securing the attachment member to the cannula.
- 12. The method according to claim 11, further comprising removing the cannula from engagement with the mounting structure in a distal-to-proximal direction.

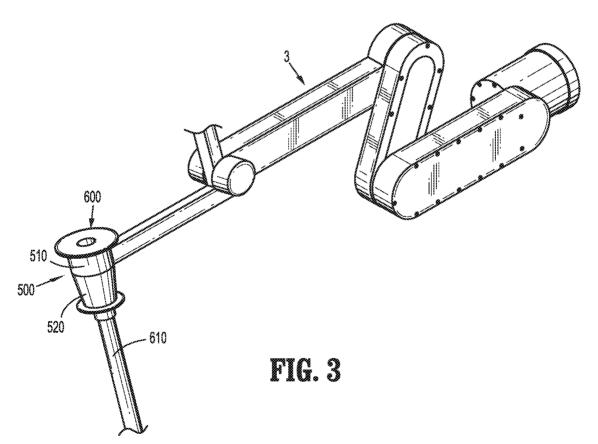
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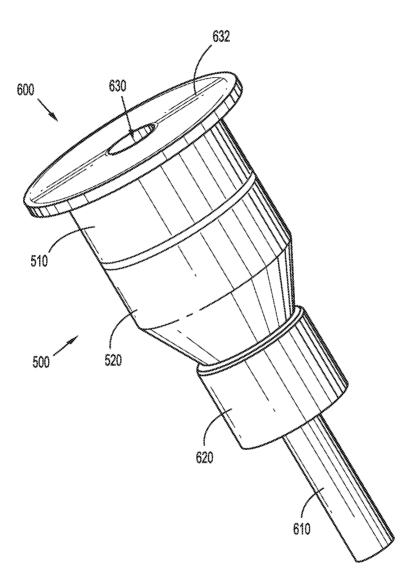


FIG. 4

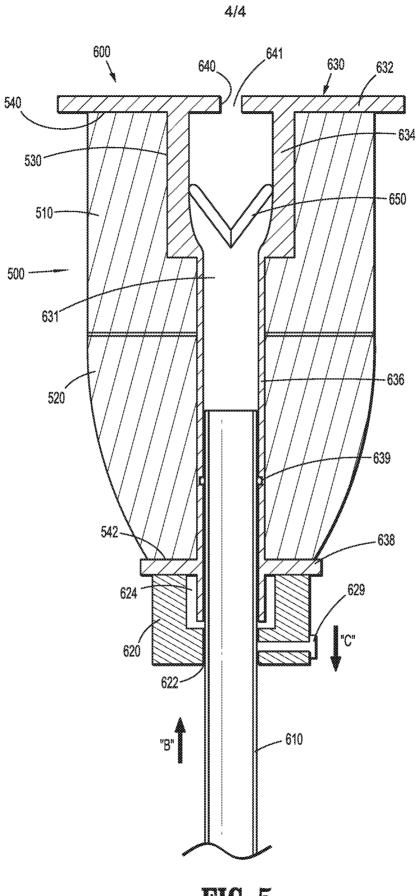


FIG. 5

International application No. **PCT/US2017/034178**

A. CLASSIFICATION OF SUBJECT MATTER

A61B 34/30(2016.01)i, A61B 17/3209(2006.01)i, A61B 17/00(2006.01)i

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) A61B 34/30; A61B 17/34; A61M 5/00; A61B 19/00; A61B 17/00; F16C 11/10; A61B 17/3209

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: surgical, arm, mounting, cannula, sterile, adaptor, connector, entry guide, clamp

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006-0161136 A1 (ANDERSON, C. S. et al.) 20 July 2006 See paragraphs [0071]-[0091]; figures 10-26B.	8,9
A	oce paragraphs [5071] [5001], 11gares 17 202.	1-7,10-12
Y	US 2013-0164075 A1 (MURPHY, S. B.) 27 June 2013 See paragraphs [0015]-[0019]; figures 1-2.	8,9
A	US 2014-0296872 A1 (INTUITIVE SURGICAL OPERATIONS, INC.) 02 October 2014 See the whole document.	1-12
A	US 2013-0338679 A1 (TECHNISCHE UNIVERSITEIT EINDHOVEN) 19 December 2013 See the whole document.	1-12
A	EP 1625863 A2 (UNITED STATES SURGICAL CORPORATION) 15 February 2006 See the whole document.	1-12

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority
"A"	document defining the general state of the art which is not considered		date and not in conflict with the application but cited to understand
	to be of particular relevance		the principle or theory underlying the invention
"E"	earlier application or patent but published on or after the international	"X"	document of particular relevance; the claimed invention cannot be
	filing date		considered novel or cannot be considered to involve an inventive
"L"	document which may throw doubts on priority claim(s) or which is		step when the document is taken alone
	cited to establish the publication date of another citation or other	"Y"	document of particular relevance; the claimed invention cannot be
	special reason (as specified)		considered to involve an inventive step when the document is
"O"	document referring to an oral disclosure, use, exhibition or other		combined with one or more other such documents, such combination

document published prior to the international filing date but later "&" document member of the same patent family than the priority date claimed

Date of the actual completion of the international search
12 September 2017 (12.09.2017)

Date of mailing of the international search report

12 September 2017 (12.09.2017)

Name and mailing address of the ISA/KR



Further documents are listed in the continuation of Box C.

Authorized officer

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See patent family annex.

being obvious to a person skilled in the art



Information on patent family members

International application No.

Patent document	Deletione		
cited in search report	Publication date	Patent family member(s)	Publication date
US 2006-0161136 A1	20/07/2006	CA 2273939 A1	18/06/1998
		CA 2273939 C	11/04/2006
		CN 101242788 A	13/08/2008
		CN 101242788 B	13/04/2011
		CN 101242789 A	13/08/2008
		CN 101242789 B	19/10/2011
		CN 101321606 A	10/12/2008
		CN 101321606 B	17/04/2013
		CN 101340848 A	07/01/2009
		CN 101340848 B	21/03/2012
		CN 101340852 A	07/01/2009
		CN 101340852 B	28/12/2011
		CN 101426412 A	06/05/2009
		CN 101426412 B	11/12/2013
		CN 102058437 A	18/05/2011
		CN 102058437 B	25/03/2015
		CN 103192388 A	10/07/2013
		CN 103192388 B EP 1015068 A1	10/02/2016
		EP 1015068 A1 EP 1015068 B1	05/07/2000
		EP 1015008 B1 EP 1146830 A1	07/09/2011 24/10/2001
		EP 1146830 B1	21/04/2010
		EP 1197902 A2	17/04/2010
		EP 1197902 A3	07/04/2004
		EP 1897511 A2	12/03/2008
		EP 1897511 A3	23/07/2008
		EP 1897511 B1	12/02/2014
		EP 1901884 A2	26/03/2008
		EP 1928342 A1	11/06/2008
		EP 1931275 A1	18/06/2008
		EP 1931275 B1	09/03/2011
		EP 1962711 A1	03/09/2008
		EP 1962711 B1	29/02/2012
		EP 2135577 A2	23/12/2009
		EP 2135577 A3	25/08/2010
		EP 2135637 A2	23/12/2009
		EP 2135637 A3	15/02/2012
		EP 2135637 B1	21/05/2014
		EP 2263592 A2	22/12/2010
		EP 2263592 A3	20/03/2013
		EP 2263592 B1	09/12/2015
		EP 2263593 A2	22/12/2010
		EP 2263593 A3	13/03/2013
		EP 2263593 B1	11/03/2015
		EP 2263594 A2	22/12/2010
		EP 2263594 A3	10/04/2013
		EP 2263594 B1	31/08/2016
		EP 2263595 A2 EP 2263595 A3	22/12/2010 06/03/2013

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 2263595 B1	17/09/2014
		EP 2298216 A2	23/03/2011
		EP 2298216 A3	22/10/2014
		EP 2298216 B1	20/04/2016
		EP 2298217 A2	23/03/2011
		EP 2298217 A3	22/10/2014
		EP 2298217 B1	10/08/2016
		EP 2298218 A2	23/03/2011
		EP 2298218 B1 EP 2298219 A2	15/06/2016 23/03/2011
		EP 2298219 A3	30/05/2012
		EP 2298219 B1	20/04/2016
		EP 2335635 A1	22/06/2011
		EP 2335635 B1	20/07/2016
		EP 2338432 A1	29/06/2011
		EP 2338432 B1	11/02/2015
		EP 2338433 A1	29/06/2011
		EP 2338433 B1	11/02/2015
		EP 2356951 A1	17/08/2011
		EP 2359769 A1 EP 2359769 B1	24/08/2011 14/10/2015
		EP 2359770 A1	24/08/2011
		EP 2359770 B1	06/05/2015
		EP 2360708 A1	24/08/2011
		EP 2363091 A2	07/09/2011
		EP 2363091 A3	28/03/2012
		EP 2363091 B1	27/04/2016
		EP 2559396 A2	20/02/2013
		EP 2559396 A3	11/12/2013
		EP 2987461 A1 EP 3104324 A1	24/02/2016 14/12/2016
		EP 3111876 A2	04/01/2017
		EP 3111876 A3	29/03/2017
		JP 2002-082977 A	22/03/2002
		JP 2002-500524 A	08/01/2002
		JP 2007-167643 A	05/07/2007
		JP 2007-167644 A	05/07/2007
		JP 2007-325959 A	20/12/2007
		JP 2008-544814 A	11/12/2008
		JP 2009-509653 A	12/03/2009
		JP 2009-509654 A JP 2009-520573 A	12/03/2009 28/05/2009
		JP 2009-320373 A JP 2010-214166 A	30/09/2010
		JP 2011-194247 A	06/10/2011
		JP 2012-061350 A	29/03/2012
		JP 2012-061351 A	29/03/2012
		JP 2012-120884 A	28/06/2012
		JP 2012-125589 A	05/07/2012
		JP 2012-152583 A	16/08/2012
		JP 2012-254360 A	27/12/2012

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		 JР 2013-027733 A	07/02/2013
		JP 2013-066775 A	18/04/2013
		JP 2013-135862 A	11/07/2013
		JP 2013-138965 A	18/07/2013
		JP 2014-004483 A	16/01/2014
		JP 2014-076361 A	01/05/2014
		JP 2014-111080 A JP 2014-111081 A	19/06/2014 19/06/2014
		JP 2014-111061 A JP 2014-138903 A	31/07/2014
		JP 2015-006423 A	15/01/2015
		JP 2015-062734 A	09/04/2015
		JP 2015-091331 A	14/05/2015
		JP 2016-019766 A	04/02/2016
		JP 2016-120313 A	07/07/2016
		JP 2017-000842 A	05/01/2017
		JP 4058113 B2	05/03/2008
		JP 4552296 B2	29/09/2010
		JP 5043414 B2 JP 5101519 B2	10/10/2012 19/12/2012
		JP 5193049 B2	08/05/2013
		JP 5283241 B2	04/09/2013
		JP 5288609 B2	11/09/2013
		JP 5301607 B2	25/09/2013
		JP 5318826 B2	16/10/2013
		JP 5386602 B2	15/01/2014
		JP 5398036 B2	29/01/2014
		JP 5403864 B2 JP 5610547 B2	29/01/2014 22/10/2014
		JP 5642208 B2	17/12/2014
		JP 5709318 B2	30/04/2015
		JP 5778234 B2	16/09/2015
		JP 5787374 B2	30/09/2015
		JP 5807974 B2	10/11/2015
		JP 5866123 B2	17/02/2016
		JP 5898105 B2	06/04/2016
		JP 5996592 B2 KR 10-0846252 B1	21/09/2016 16/07/2008
		KR 10-0840232 B1 KR 10-1207286 B1	03/12/2012
		KR 10-1207250 B1 KR 10-1274595 B1	13/06/2013
		KR 10-1298492 B1	21/08/2013
		KR 10-1299472 B1	29/08/2013
		KR 10-1332210 B1	25/11/2013
		KR 10-1337270 B1	06/12/2013
		KR 10-1337278 B1	09/12/2013
		KR 10-1337281 B1 KR 10-2008-0072625 A	06/12/2013 06/08/2008
		US 2002-0032451 A1	14/03/2002
		US 2002 0032451 A1 US 2002-0032452 A1	14/03/2002
		US 2002-0072736 A1	13/06/2002
		US 2002-0091374 A1	11/07/2002

Information on patent family members

International application No.

US 2005-0021050 A1	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003-0083673 Al 01/05/2005 US 2005-0149003 Al 07/07/2006 US 2006-01610360 Al 19/01/2006 US 2006-0161137 Al 20/07/2006 US 2006-0161138 Al 20/07/2006 US 2006-0161138 Al 20/07/2006 US 2006-0161138 Al 20/07/2006 US 2006-0161138 Al 19/10/2006 US 2007-001545 Al 19/10/2006 US 2007-001545 Al 19/10/2006 US 2007-001545 Al 19/10/2006 US 2007-001545 Al 19/10/2007 US 2007-011373 Al 18/01/2007 US 2007-0137371 Al 21/06/2007 US 2007-0137372 Al 21/06/2007 US 2007-014284 Al 21/06/2007 US 2008-0140088 Al 12/06/2008 US 2008-0147099 Al 19/06/2008 US 2008-0147091 Al 19/06/2008 US 2008-0147091 Al 19/06/2008 US 2009-0248043 Al 01/10/2008 US 2010-0163057 Al 01/07/2016 US 2010-0163057 Al 01/07/2016 US 2011-0028990 Al 08/07/2016 US 2011-0028990 Al 08/07/2016 US 2011-0288561 Al 24/11/2011 US 2012-0209992 Al 16/08/2012 US 2012-023960 Al 20/09/2012 US 2012-023960 Al 19/06/2016 US 2013-0331858 Al 12/12/2013 US 2014-0163581 Al 19/06/2014 US 2013-0331858 Al 12/12/2013 US 2014-0163581 Al 19/06/2014 US 2015-0073437 Al 12/06/2014			US 2002-0099763 A1	25/07/2002
US 2005-0021050 A1				01/05/2003
US 2005-0149003 A1 19/101/2006 US 2006-0161137 A1 20/07/2006 US 2006-0161138 A1 20/07/2006 US 2006-0161138 A1 20/07/2006 US 2007-0005045 A1 19/10/2006 US 2007-0005045 A1 19/10/2006 US 2007-0005045 A1 19/10/2006 US 2007-0119274 A1 31/05/2007 US 2007-0119274 A1 31/05/2007 US 2007-0137371 A1 21/06/2007 US 2007-0137372 A1 21/06/2007 US 2007-0142842 A1 21/06/2007 US 2007-0142842 A1 21/06/2007 US 2008-0140088 A1 12/06/2007 US 2008-0147099 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0248013 A1 01/107/2016 US 2010-0163057 A1 01/07/2016 US 2010-0163057 A1 01/07/2016 US 2011-0028090 A1 03/02/2011 US 2011-0028090 A1 17/08/2018 US 2011-0028990 A1 03/02/2011 US 2011-0288961 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2011-028566 A1 17/03/2011 US 2012-029992 A1 16/08/2012 US 2012-029992 A1 16/08/2012 US 2012-029992 A1 16/08/2012 US 2012-029992 A1 16/08/2012 US 2012-0299960 A1 27/12/2012 US 2012-0239660 A1 27/12/2012 US 2012-023966 A1 13/09/2012 US 2012-023966 A1 13/09/2012 US 2012-023966 A1 13/09/2012 US 2012-023968 A1 12/12/2013 US 2012-023968 A1 12/12/2013 US 2012-0303025 A1 27/12/2012 US 2013-0374761 A1 17/10/2013 US 2013-0374789 A1 04/10/2016 US 2014-0163981 A1 12/12/2013 US 2013-0374789 A1 12/12/2013 US 2013-0374789 A1 12/12/2013 US 2013-0374789 A1 12/12/2013 US 2013-0374789 A1 12/12/2013 US 2013-037489 B1 12/12/2013 US 2013-03849 B2 24/10/2006				27/01/2005
US 2006-0161137 A1 20/07/2006 US 2006-025436 A1 19/10/2006 US 2007-0005045 A1 04/01/2006 US 2007-0012135 A1 18/01/2007 US 2007-0119274 A1 31/05/2007 US 2007-0137371 A1 21/06/2007 US 2007-0137371 A1 21/06/2007 US 2007-014384 A1 21/06/2007 US 2007-014284 A1 21/06/2007 US 2007-0142896 A1 12/06/2007 US 2008-0144089 A1 19/06/2008 US 2008-0147081 A1 19/06/2008 US 2008-0147081 A1 19/06/2008 US 2008-0248043 A1 01/10/2008 US 2009-0248043 A1 01/10/2008 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/10/2008 US 2010-0174293 A1 08/07/2016 US 2011-0028990 A1 03/02/2011 US 2011-0288561 A1 17/03/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2011-028950 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209293 A1 08/03/2012 US 2012-0209293 A1 04/10/2018 US 2012-0209396 A1 20/10/2018 US 2012-039306 A1 20/10/2018 US 2012-039306 A1 20/10/2018 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2015-0173841 A1 25/06/2014 US 2015-023867 A1 27/08/2018 US 2015-023867 A1 27/08/2018 US 2015-023867 A1 27/08/2018 US 2015-0173841 A1 25/06/2018 US 2015-023867 A1 27/08/2018 US 2015-03388 A 17/10/2006 US 6990489 B2 24/01/2006				07/07/2005
US 2006-0161138 A1			US 2006-0015508 A1	19/01/2006
US 2006-0235436 A1 19/10/2006 US 2007-0005045 A1 04/01/2007 US 2007-00119274 A1 31/05/2007 US 2007-0119274 A1 31/05/2007 US 2007-01137371 A1 21/06/2007 US 2007-0137372 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2007-0142899 A1 21/06/2007 US 2008-0147089 A1 19/06/2008 US 2008-0147089 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0248043 A1 01/10/2008 US 2009-0248043 A1 01/10/2008 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2016 US 2010-0174293 A1 08/07/2016 US 2011-00163057 A1 01/07/2016 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0289561 A1 24/11/2011 US 2011-0289561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0203566 A1 13/09/2012 US 2012-0203566 A1 13/09/2012 US 2012-0233666 A1 13/09/2012 US 2012-0233666 A1 13/09/2012 US 2012-0233668 A1 13/09/2012 US 2012-0233668 A1 13/09/2012 US 2012-0233668 A1 13/09/2012 US 2012-0233668 A1 13/09/2012 US 2013-0331858 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2015-0333858 A1 12/12/2003 US 2015-033858 A1 12/12/2013 US 2015-0073437 A1 12/03/2015 US 2				20/07/2006
US 2007-0005045 A1				20/07/2006
US 2007-0012135 A1 38/01/2007 US 2007-0119274 A1 31/05/2007 US 2007-0137371 A1 21/06/2007 US 2007-0137372 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2008-0140088 A1 12/06/2008 US 2008-0147089 A1 19/06/2008 US 2008-0147089 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0248043 A1 01/10/2008 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2016 US 2010-0174293 A1 08/07/2016 US 2010-0200002 A1 12/08/2016 US 2011-0028990 A1 08/07/2016 US 2011-0288961 A1 24/11/2011 US 2011-0288961 A1 24/11/2011 US 2011-028990 A1 08/03/2011 US 2011-028990 A1 08/03/2011 US 2011-0290991 A1 16/08/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0239566 A1 13/09/2012 US 2012-0233966 A1 20/09/2012 US 2012-0233966 A1 20/09/2012 US 2012-0233966 A1 17/10/2013 US 2012-0233966 A1 17/10/2013 US 2012-02347489 A1 04/10/2012 US 2012-02347489 A1 04/10/2012 US 2012-02347461 A1 17/10/2013 US 2013-0331858 A1 12/16/2014 US 2014-0163581 A1 12/06/2014 US 2015-0238267 A1 27/08/2015 US 2015-0238267 A1 27/08/2015 US 2015-0238267 A1 17/10/2013 US 2015-073437 A1 12/03/2016 US 2015-073841 A1 12/03/2016 US 649072 B1 12/02/2002 US 649072 B1 12/02/2002 US 6490748 B2 24/01/2006				19/10/2006
US 2007-0119274 A1 21/06/2007 US 2007-0137371 A1 21/06/2007 US 2007-0137372 A1 21/06/2007 US 2007-0149284 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2008-0140088 A1 12/06/2008 US 2008-0147089 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2008 US 2009-0234371 A1 17/09/2008 US 2010-0163057 A1 01/07/2016 US 2010-0163057 A1 01/07/2016 US 2010-0174293 A1 08/07/2016 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0288561 A1 17/03/2011 US 2011-0288561 A1 08/09/2011 US 2011-0288561 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 17/10/2013 US 2012-0239566 A1 20/09/2012 US 2012-0239566 A1 17/10/2013 US 2012-0239566 A1 17/10/2013 US 2012-0239566 A1 17/10/2013 US 2012-033958 A1 12/12/2013 US 2012-0374761 A1 17/10/2013 US 2013-0374761 A1 17/10/2013 US 2013-0374761 A1 17/10/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0173841 A1 12/06/2014 US 2015-0073437 A1 12/03/2016 US 2015-0173841 A1 12/06/2014 US 2015-0173841 A1 12/06/2016 US 633181 B1 18/12/2002 US 6390489 B2 15/03/2006				04/01/2007
US 2007-0137371 A1 21/06/2007 US 2007-01437372 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2007-0142969 A1 21/06/2007 US 2008-0140088 A1 12/06/2008 US 2008-0147091 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2008 US 2009-0234371 A1 17/09/2008 US 2010-0163057 A1 01/07/2016 US 2010-0163057 A1 08/07/2016 US 2010-0163057 A1 08/07/2016 US 2010-0200002 A1 12/08/2016 US 2011-028990 A1 03/02/2011 US 2011-028990 A1 03/02/2011 US 2011-0288561 A1 24/11/2011 US 2011-028990 A1 08/03/2012 US 2012-029390 A1 08/03/2012 US 2012-029390 A1 16/08/2012 US 2012-029390 A1 16/08/2012 US 2012-0239566 A1 24/11/2011 US 2012-0239566 A1 24/11/2011 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 17/10/2012 US 2012-0239566 A1 17/10/2012 US 2012-0239566 A1 17/10/2012 US 2012-0239566 A1 17/10/2012 US 2012-0330325 A1 27/12/2012 US 2012-0330325 A1 17/10/2012 US 2013-0274761 A1 17/10/2012 US 2014-0163581 A1 12/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-073347 A1 12/03/2015 US 2015-073481 A1 12/06/2014 US 2015-0734841 A1 12/06/2014 US 2				
US 2007-0137372 A1 21/06/2007 US 2007-0142824 A1 21/06/2007 US 2007-0142869 A1 12/06/2008 US 2008-0140088 A1 12/06/2008 US 2008-0147099 A1 19/06/2008 US 2008-0147099 A1 19/06/2008 US 2009-0234371 A1 17/09/2008 US 2009-0234371 A1 17/09/2008 US 2010-0163057 A1 01/07/2010 US 2010-0163057 A1 01/07/2010 US 2010-0163057 A1 01/07/2010 US 2010-0163057 A1 01/07/2010 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0086161 A1 17/03/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0203960 A1 20/09/2012 US 2012-023960 A1 13/09/2012 US 2012-023960 A1 13/09/2012 US 2012-023960 A1 20/10/2012 US 2012-0303025 A1 27/12/2012 US 2012-0303025 A1 27/12/2012 US 2013-0331858 A1 12/106/2014 US 2014-0163581 A1 12/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073841 A1 25/06/2014 US 2015-0073841 A1 25/06/2014 US 2015-0073841 A1 25/06/2014 US 2015-0073841 A1 25/06/2014 US 2015-0173841 A1 12/03/2015				
US 2007-0142824 A1 21/06/2007 US 2007-0142969 A1 12/06/2008 US 2008-0147089 A1 12/06/2008 US 2008-0147089 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2008 US 2009-0234371 A1 17/09/2008 US 2010-0163057 A1 01/07/2016 US 2010-0163057 A1 08/07/2016 US 2010-0200002 A1 12/08/2016 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 08/09/2012 US 2012-0299291 A1 16/08/2012 US 2012-0299291 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0233060 A1 10/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0247489 A1 04/10/2012 US 2012-0247489 A1 04/10/2012 US 2012-0247489 A1 04/10/2012 US 2013-0274761 A1 17/10/2013 US 2013-0274761 A1 17/10/2013 US 2013-031858 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2015-0238267 A1 12/03/2016 US 2015-0238267 A1 27/08/2016 US 633181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6866671 B2 15/03/2006				
US 2007-0142969 A1				
US 2008-0147088 A1 12/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2008 US 2009-0234371 A1 17/09/2008 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2016 US 2010-0174293 A1 08/07/2016 US 2010-0200002 A1 12/08/2016 US 2011-0028990 A1 03/02/2011 US 2011-0028151 A1 17/03/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 13/09/2012 US 2012-0239566 A1 17/09/2012 US 2012-0239566 A1 17/09/2012 US 2012-0239566 A1 17/09/2012 US 2012-0330325 A1 27/12/2013 US 2013-0331858 A1 12/10/2013 US 2013-0331858 A1 12/10/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073841 A1 25/06/2016 US 6132368 A 17/10/2006 US 6331181 B1 18/12/2001 US 6132368 A 17/10/2006 US 633181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6866671 B2 15/03/2006				
US 2008-0147089 A1 19/06/2008 US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2009 US 2009-0248043 A1 01/07/2010 US 2010-0163057 A1 01/07/2010 US 2010-0174293 A1 08/07/2010 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 03/02/2011 US 2011-0066161 A1 17/03/2011 US 2011-0288561 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0299291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 13/09/2012 US 2012-023960 A1 20/09/2012 US 2012-0237980 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2012-0330325 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-017965 A1 19/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 25/06/2014 US 2015-0238267 A1 27/08/2015 US 2015-0173841 A1 25/06/2014 US 2015-0238267 A1 27/08/2015 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 12/03/2015 US 2015-0153841 A1 12/03/2015				
US 2008-0147091 A1 19/06/2008 US 2009-0234371 A1 17/09/2006 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2010 US 2010-0174293 A1 08/07/2010 US 2010-0200002 A1 12/08/2010 US 2011-028990 A1 03/02/2011 US 2011-028890 A1 03/02/2011 US 2011-0288561 A1 17/03/2011 US 2011-0288561 A1 24/11/2011 US 2011-0288561 A1 24/11/2011 US 2012-0299291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2013-02330325 A1 27/12/2012 US 2013-02330325 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0180310 A1 26/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0238267 A1 27/08/2015 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6132368 A 17/10/2000 US 6346072 B1 12/02/2002 US 6866671 B2 15/03/2005 US 6890489 B2 24/01/2006				
US 2009-0234371 A1 17/09/2008 US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2010 US 2010-0174293 A1 08/07/2010 US 2010-0200002 A1 12/08/2010 US 2011-0028990 A1 03/02/2011 US 2011-006161 A1 17/03/2011 US 2011-028551 A1 08/09/2011 US 2011-028551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 04/10/2012 US 2012-0247489 A1 04/10/2012 US 2012-02374761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-073437 A1 12/03/2015 US 2015-073847 A1 12/03/2015 US 2015-0738867 A1 77/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6390489 B2 15/03/2006				
US 2009-0248043 A1 01/10/2008 US 2010-0163057 A1 01/07/2010 US 2010-0174293 A1 08/07/2010 US 2010-0200002 A1 12/08/2010 US 2011-028990 A1 03/02/2011 US 2011-0289561 A1 17/03/2011 US 2011-0288561 A1 24/11/2011 US 2012-0209291 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209291 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0233060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0330325 A1 27/12/2012 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-073841 A1 25/06/2014 US 2015-073841 A1 25/06/2014 US 2015-073847 A1 12/03/2015 US 2016-0157943 A1 09/06/2016 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6390489 B2 15/03/2006				
US 2010-0163057 A1 01/07/2010 US 2010-0174293 A1 08/07/2010 US 2010-0200002 A1 12/08/2010 US 2011-0028990 A1 03/02/2011 US 2011-0028990 A1 17/03/2011 US 2011-0218551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0233566 A1 13/09/2012 US 2012-0233566 A1 13/09/2012 US 2012-0233566 A1 13/09/2012 US 2012-0330325 A1 27/12/2012 US 2013-0374761 A1 17/10/2013 US 2013-0374761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0180310 A1 26/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-073841 A1 25/06/2014 US 2015-073847 A1 12/03/2015 US 2015-073847 A1 12/03/2015 US 2015-073847 A1 12/03/2015 US 2015-073847 A1 12/03/2015 US 2016-0157943 A1 09/06/2016 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6346071 B2 10/12/2002 US 6886671 B2 15/03/2005				
US 2010-0174293 A1 08/07/2010 US 2010-0200002 A1 12/08/2010 US 2011-0028990 A1 03/02/2011 US 2011-0066161 A1 17/03/2011 US 2011-0218551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-023966 A1 13/09/2012 US 2012-023966 A1 13/09/2012 US 2012-023966 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0274761 A1 17/10/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0173841 A1 25/06/2014 US 2015-0073437 A1 12/03/2018 US 2015-0073437 A1 12/03/2018 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 12/03/2018 US 2015-0173841 A1 12/08/2018 US 2015-0173841 A1 12/08/2018 US 2015-0173841 A1 12/08/2018 US 2016-0157943 A1 09/06/2014 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6866671 B2 10/12/2002 US 6890489 B2 24/01/2006				
US 2010-020002 A1 12/08/2010 US 2011-0028990 A1 03/02/2011 US 2011-0066161 A1 17/03/2011 US 2011-0288561 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0330325 A1 27/12/2012 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-018030 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-073841 A1 25/06/2015 US 2015-073847 A1 12/03/2015 US 2016-0157943 A1 09/06/2016 US 6346072 B1 12/02/2002 US 6346072 B1 12/02/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2011-0028990 A1 03/02/2011 US 2011-0066161 A1 17/03/2011 US 2011-0218551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-023960 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0330325 A1 27/12/2012 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-073437 A1 12/03/2015 US 2015-073841 A1 25/06/2014 US 2015-073841 A1 25/06/2014 US 2015-073841 A1 25/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				12/08/2010
US 2011-0066161 A1 17/03/2011 US 2011-0218551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 13/09/2012 US 2012-0232566 A1 20/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0274761 A1 17/10/2013 US 2013-031858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0180310 A1 26/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2013 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 25/06/2014 US 2015-0173841 A1 25/06/2016 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2002 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				03/02/2011
US 2011-0218551 A1 08/09/2011 US 2011-0288561 A1 24/11/2011 US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0239266 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2013-02374761 A1 17/10/2013 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0238267 A1 27/08/2015 US 2015-0238267 A1 27/08/2015 US 2016-015943 A1 09/06/2014 US 6331181 B1 18/12/2001 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				17/03/2011
US 2012-0059390 A1 08/03/2012 US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2013 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				08/09/2011
US 2012-0209291 A1 16/08/2012 US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005			US 2011-0288561 A1	24/11/2011
US 2012-0209292 A1 16/08/2012 US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005				08/03/2012
US 2012-0232566 A1 13/09/2012 US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2013 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				16/08/2012
US 2012-0239060 A1 20/09/2012 US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				16/08/2012
US 2012-0247489 A1 04/10/2012 US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				13/09/2012
US 2012-0330325 A1 27/12/2012 US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2014 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2013-0274761 A1 17/10/2013 US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2013-0331858 A1 12/12/2013 US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2014-0163581 A1 12/06/2014 US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2014-0171965 A1 19/06/2014 US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2014-0180310 A1 26/06/2014 US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2015-0073437 A1 12/03/2015 US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2015-0173841 A1 25/06/2015 US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2015-0238267 A1 27/08/2015 US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 2016-0157943 A1 09/06/2016 US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 6132368 A 17/10/2000 US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				
US 6331181 B1 18/12/2001 US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				17/10/2000
US 6346072 B1 12/02/2002 US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				18/12/2001
US 6491701 B2 10/12/2002 US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				12/02/2002
US 6866671 B2 15/03/2005 US 6990489 B2 24/01/2006				10/12/2002
				15/03/2005
US 7048745 B2 23/05/200€				24/01/2006
			US 7048745 B2	23/05/2006

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7357774 B2	15/04/2008
		US 7524320 B2	28/04/2009
		US 7580955 B2	25/08/2009
		US 7666191 B2	23/02/2010
		US 7699855 B2	20/04/2010
		US 7727244 B2	01/06/2010
		US 7819885 B2	26/10/2010
		US 7955322 B2	07/06/2011
		US 7963913 B2	21/06/2011
		US 8100133 B2	24/01/2012
		US 8105338 B2 US 8142447 B2	31/01/2012 27/03/2012
		US 8142447 BZ US 8182469 B2	22/05/2012
		US 8182470 B2	22/05/2012
		US 8202278 B2	19/06/2012
		US 8206406 B2	26/06/2012
		US 8216250 B2	10/07/2012
		US 8273076 B2	25/09/2012
		US 8469947 B2	25/06/2013
		US 8529582 B2	10/09/2013
		US 8608773 B2	17/12/2013
		US 8641700 B2	04/02/2014
		US 8672922 B2 US 8758352 B2	18/03/2014 24/06/2014
		US 8888764 B2	18/11/2014
		US 8894634 B2	25/11/2014
		US 8998799 B2	07/04/2015
		US 8998930 B2	07/04/2015
		US 9050119 B2	09/06/2015
		US 9259276 B2	16/02/2016
		US 9320568 B2	26/04/2016
		US 9439732 B2	13/09/2016
		US 9480533 B2	01/11/2016
		US 9486288 B2 US 9532849 B2	08/11/2016 03/01/2017
		US 9532849 B2 US 9724163 B2	08/08/2017
		WO 00-33755 A1	15/06/2000
		WO 2007-005555 A2	11/01/2007
		WO 2007-005555 A3	21/06/2007
		WO 2007-041093 A1	12/04/2007
		WO 2007-041094 A1	12/04/2007
		WO 2007-075844 A1	05/07/2007
		WO 2007-075864 A1	05/07/2007
		WO 2007-126443 A2	08/11/2007
		WO 2007-126443 A3	31/07/2008
		WO 2007-142698 A2 WO 2007-142698 A3	13/12/2007 21/02/2008
		WO 2007-142698 A3 WO 2009-061915 A2	14/05/2009
		WO 2009-061915 A3	23/07/2009
		WO 98-25666 A1	18/06/1998

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013-0164075 A1	27/06/2013	AU 2008-319329 A1	07/05/2009
		AU 2008-319329 B2	09/01/2014
		AU 2012-371568 A1	06/09/2013
		AU 2012-371568 B2	08/06/2017
		CA 2702752 A1	07/05/2009
		CA 2856552 A1	06/09/2013
		CN 104080453 A	01/10/2014
		EP 2211750 A1	04/08/2010
		EP 2211750 B1 EP 2626031 A2	08/04/2015 14/08/2013
		EP 2626031 A2 EP 2626031 A3	24/09/2014
		EP 2626031 B1	06/04/2016
		EP 2626032 A2	14/08/2013
		EP 2626032 A3	23/04/2014
		EP 2785339 A2	08/10/2014
		JP 2011-502626 A	27/01/2011
		JP 2013-208463 A	10/10/2013
		JP 2014-204970 A	30/10/2014
		JP 2015-500244 A	05/01/2015
		JP 2017-077493 A	27/04/2017
		JP 5560195 B2	23/07/2014
		JP 5805140 B2	04/11/2015
		JP 6068383 B2 KR 10-1594633 B1	25/01/2017 16/02/2016
		KR 10-1394033 B1 KR 10-2014-0109386 A	15/09/2014
		US 2009-0306679 A1	10/12/2009
		US 2013-0006255 A1	03/01/2013
		US 2013-0018430 A1	17/01/2013
		US 2015-0246057 A1	03/09/2015
		US 2015-0289891 A1	15/10/2015
		US 8267938 B2	18/09/2012
		US 9101378 B2	11/08/2015
		US 9295674 B2	29/03/2016
		US 9474470 B2	25/10/2016
		WO 2009-058319 A1 WO 2013-130150 A2	07/05/2009 06/09/2013
US 2014-0296872 A1	02/10/2014	CN 101500470 A	05/08/2009
		CN 101500470 B	25/03/2015
		CN 102076276 A	25/05/2011
		CN 102076276 B	14/01/2015
		CN 102170835 A	31/08/2011
		CN 102170835 B	21/01/2015
		CN 102448680 A CN 102448680 B	09/05/2012
		CN 102448680 B CN 102802550 A	27/04/2016 28/11/2012
		CN 102802550 A CN 102802550 B	09/03/2016
		CN 102802336 B	23/01/2013
		CN 102892374 A	23/01/2013
		CN 102892374 B	24/06/2015

Information on patent family members

International application No.

Patent document	ocument Publication Patent family Public		
cited in search report	date	member(s)	date
1		`,	
		ON 10000007F A	00/01/0010
		CN 102892375 A	23/01/2013
		CN 102892375 B	19/08/2015
		CN 102892376 A	23/01/2013
		CN 102892376 B	20/04/2016
		CN 102905641 A	30/01/2013
		CN 102905641 B	16/03/2016
		CN 103930063 A	16/07/2014
		CN 103930063 B	16/11/2016
		CN 103930064 A	16/07/2014
		CN 103930064 B	19/04/2017
		CN 104490474 A	08/04/2015
		CN 104490474 B	05/04/2017
		CN 104688281 A	10/06/2015
		CN 104688281 B	19/04/2017
		CN 104688282 A	10/06/2015
		CN 104688327 A	10/06/2015
		CN 104688327 B	09/06/2017
		CN 104688328 A	10/06/2015
		CN 104688328 B	29/03/2017
		CN 104688349 A	10/06/2015
		CN 104688349 B	10/05/2017
		CN 104720887 A	24/06/2015
		CN 104720887 B	10/05/2017
		CN 104958085 A	07/10/2015
		CN 104958111 A	07/10/2015
		CN 105125263 A	09/12/2015
		CN 105616007 A	01/06/2016
		CN 105748026 A	13/07/2016
		CN 105852976 A	17/08/2016
		CN 106236277 A	21/12/2016
		EP 2037794 A2	25/03/2009
		EP 2038712 A2	25/03/2009
		EP 2038712 B1	17/08/2011
		EP 2046538 A2	15/04/2009
		EP 2326277 A1	01/06/2011
		EP 2349053 A1	03/08/2011
		EP 2414137 A2	08/02/2012
		EP 2414137 B1	21/06/2017
		EP 2445436 A1	02/05/2012
		EP 2445436 B1	30/11/2016
		EP 2568894 A1	20/03/2013
		EP 2568908 A1	20/03/2013
		EP 2568909 A1	20/03/2013
		EP 2568912 A1	20/03/2013
		EP 2568913 A1	20/03/2013
		EP 2775950 A1	17/09/2014
		EP 2775951 A1	17/09/2014
		EP 3115159 A1	11/01/2017
		JP 2009-539573 A	19/11/2009
		JP 2009-542362 A	03/12/2009

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2011-525845 A	29/09/2011
		JP 2012-213655 A	08/11/2012
		JP 2012-504017 A	16/02/2012
		JP 2012-521855 A	20/09/2012
		JP 2013-150833 A	08/08/2013
		JP 2013-188574 A	26/09/2013
		JP 2013-526337 A	24/06/2013
		JP 2013-528064 A	08/07/2013
		JP 2013-528065 A	08/07/2013
		JP 2013-530738 A	01/08/2013
		JP 2014-012212 A	23/01/2014
		JP 2014-028228 A JP 2014-054534 A	13/02/2014
		JP 2014-054534 A JP 2014-054535 A	27/03/2014 27/03/2014
		JP 2014-054535 A JP 2014-057848 A	03/04/2014
		JP 2014-057849 A	03/04/2014
		JP 2014-057850 A	03/04/2014
		JP 2014-057851 A	03/04/2014
		JP 2014-057852 A	03/04/2014
		JP 2014-057853 A	03/04/2014
		JP 2014-057854 A	03/04/2014
		JP 2014-097431 A	29/05/2014
		JP 2015-051287 A	19/03/2015
		JP 2015-147059 A	20/08/2015
		JP 2015-154956 A	27/08/2015
		JP 2015-211865 A	26/11/2015
		JP 2015-502198 A	22/01/2015
		JP 2015-506850 A	05/03/2015
		JP 2016-052521 A	14/04/2016
		JP 2016-052577 A	14/04/2016
		JP 2016-101506 A	02/06/2016
		JP 2017-080887 A	18/05/2017
		JP 5324432 B2 JP 5372225 B2	23/10/2013 18/12/2013
		JP 5372225 B2 JP 5583123 B2	03/09/2014
		JP 5675621 B2	25/02/2015
		JP 5707449 B2	30/04/2015
		JP 5744130 B2	01/07/2015
		JP 5775154 B2	09/09/2015
		JP 5782114 B2	24/09/2015
		JP 5791203 B2	07/10/2015
		JP 5839612 B2	06/01/2016
		JP 5839613 B2	06/01/2016
		JP 5839614 B2	06/01/2016
		JP 5839615 B2	06/01/2016
		JP 5839616 B2	06/01/2016
		JP 5840121 B2	06/01/2016
		JP 5849090 B2	27/01/2016
		JP 5851459 B2	03/02/2016
		JP 5851460 B2	03/02/2016

Information on patent family members

International application No.

JP 6087697 B2					
JP 6087368 B2 01/03/201 JP 6087697 B2 01/03/201 JP 6103453 B2 29/03/201 JP 613787 B2 12/04/201 JP 613787 B2 12/04/201 JP 6130428 B2 17/05/201 JP 613936 B2 28/06/201 KR 10-1374709 B1 17/03/201 KR 10-139206 B1 08/05/201 KR 10-1398640 B1 22/05/201 KR 10-1477121 B1 29/12/201 KR 10-1477133 B1 29/12/201 KR 10-1477133 B1 29/12/201 KR 10-1477133 B1 29/12/201 KR 10-1477738 B1 31/12/201 KR 10-147733 B1 31/12/201 KR 10-1653185 B1 09/09/201 KR 10-1663568 B1 07/10/201 KR 10-1663568 B1 12/03/201 KR 10-1760921 B1 10/02/201 KR 10-1760921 B1 10/02/201 KR 10-1760921 B1 12/04/201 KR 10-1760823 B1 22/07/201 KR 10-2013-0069547 A 26/06/201 KR 10-2013-0069547 A 26/06/201 KR 10-2013-0069547 A 26/06/201 KR 10-2013-0089592 A 08/07/201 KR 10-2013-0089370 A1 32/12/201 US 2007-0287884 A1 13/12/200 US 2007-0287899 A1 13/12/200 US 2007-0287899 A1 13/12/200 US 2007-0287899 A1 13/12/200 US 2008-0064003 A1 06/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065106 A1 13/03/200 US 2008-0065108 A1 31/03/200 US 2008-0065108 A1 31/03/200	Patent document	Publication	Patent family	Publication	
JP 6087697 B2	cited in search report	date	member(s)	date	
JP 6087697 B2					
JP 6087697 B2			JP 6087368 B2	01/03/2017	
JP 6113787 B2 12/04/201 JP 613936 B2 28/06/201 KR 10-139709 B1 17/05/201 KR 10-139206 B1 08/05/201 KR 10-1396840 B1 22/05/201 KR 10-1396840 B1 22/05/201 KR 10-1477125 B1 29/12/201 KR 10-1477125 B1 29/12/201 KR 10-1477138 B1 29/12/201 KR 10-1477138 B1 31/12/201 KR 10-1477138 B1 32/02/201 KR 10-1477138 B1 32/02/201 KR 10-1477138 B1 32/02/201 KR 10-1633185 B1 09/09/201 KR 10-1633185 B1 09/09/201 KR 10-1760521 B1 10/02/201 KR 10-1720041 B1 27/03/201 KR 10-1720041 B1 27/03/201 KR 10-1720041 B1 12/04/201 KR 10-1762623 B1 28/07/201 KR 10-2013-00696547 A 26/06/201 KR 10-2013-00696547 A 30/07/201 KR 10-2013-0089654 A 30/07/201 KR 10-2013-008965 A 30/07/201 KR 2008-00650 A 1 37/03/200 KR 2008-00650 A 1 37/03/200 KR 2008-006510 A 1 37/03/200 KR 2008-006				01/03/2017	
JP 6113787 B2 12/04/201 JP 613936 B2 28/06/201 KR 10-1397409 B1 17/05/201 KR 10-139206 B1 08/05/201 KR 10-139206 B1 08/05/201 KR 10-139840 B1 22/05/201 KR 10-139840 B1 22/12/201 KR 10-1477121 B1 29/12/201 KR 10-1477123 B1 29/12/201 KR 10-1477138 B1 31/12/201 KR 10-1477138 B1 32/2/201 KR 10-1477138 B1 32/2/201 KR 10-1477138 B1 32/2/201 KR 10-1653185 B1 09/09/201 KR 10-1653185 B1 09/09/201 KR 10-1653185 B1 09/09/201 KR 10-1760521 B1 10/02/201 KR 10-1720041 B1 27/03/201 KR 10-1720041 B1 27/03/201 KR 10-1720188 B1 12/04/201 KR 10-1762623 B1 28/07/201 KR 10-2013-00696547 A 26/06/201 KR 10-2013-0089852 A 30/07/201 KR 10-2013-0089852 A 30/07/201 KR 10-2013-0089852 A 30/07/201 KR 10-2014-0096342 A 05/08/201 US 2007-0287884 A1 13/12/200 US 2008-0065099 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 30/07/200 US 2008-0065109 A1 30/07/200 US 2008-0065109 A1 30/07/200 US 2008-0065109 A1 30/07/200				29/03/2017	
JP 6139428 B2 17/05/201 JR 10-1374709 B1 17/05/201 JR 10-1374709 B1 17/05/201 JR 10-1392206 B1 08/05/201 JR 10-1396840 B1 22/05/201 JR 10-1477121 B1 29/12/201 JR 10-1477125 B1 29/12/201 JR 10-1477125 B1 29/12/201 JR 10-1477133 B1 29/12/201 JR 10-1477133 B1 31/12/201 JR 10-1477133 B1 31/12/201 JR 10-1494283 B1 23/02/201 JR 10-1663185 B1 09/09/201 JR 10-1663185 B1 09/09/201 JR 10-1760368 B1 07/10/201 JR 10-1720018 B1 10/02/201 JR 10-1720018 B1 10/02/201 JR 10-172018 B1 12/04/201 JR 10-172018 B1 12/04/201 JR 10-172018 B1 12/04/201 JR 10-2013-006967 A 26/06/201 JR 10-2013-006967 A 26/06/201 JR 10-2013-0076825 A 08/07/201 JR 10-2013-0089962 A 26/06/201 JR 10-2013-0089962 A 26/06/201 JR 10-2013-0089962 A 26/06/201 JR 10-2013-0089962 A 26/06/201 JR 10-2013-008997 A 13/12/200 JR 2007-0287884 A1 13/12/200 JR 2007-0287889 A1 13/12/200 JR 2007-0287889 A1 13/12/200 JR 2007-0287889 A1 13/12/200 JR 2008-0065097 A1 13/03/200 JR 2008-0065097 A1 13/03/200 JR 2008-0065102 A1 13/03/200 JR 2008-0065102 A1 13/03/200 JR 2008-0065102 A1 13/03/200 JR 2008-0065107 A1 1			JP 6113787 B2	12/04/2017	
RR 10-1374709 B1				17/05/2017	
RR 10-139206 B1			JP 6153936 B2	28/06/2017	
RR 10-1396840 B1			KR 10-1374709 B1	17/03/2014	
RR 10-1477121 B1			KR 10-1392206 B1	08/05/2014	
RR 10-1477125 B1			KR 10-1396840 B1	22/05/2014	
RR 10-1477133 B1			KR 10-1477121 B1	29/12/2014	
KR 10-1477738 B1				29/12/2014	
KR 10-1494283 B1				29/12/2014	
KR 10-1653185 B1				31/12/2014	
KR 10-1663568 B1				23/02/2015	
KR 10-1705921 B1				09/09/2016	
KR 10-1720041 B1				07/10/2016	
KR 10-1726188 B1				10/02/2017	
KR 10-1762623 B1				27/03/2017	
KR 10-2013-0069547 A					
KR 10-2013-0069662 A 26/06/201 KR 10-2013-0076825 A 08/07/201 KR 10-2013-0085952 A 30/07/201 KR 10-2013-0108091 A 02/10/201 KR 10-2014-0091039 A 18/07/201 KR 10-2014-0096342 A 05/08/201 US 2007-0287884 A1 13/12/200 US 2007-0287889 A1 13/12/200 US 2008-004603 A1 13/12/200 US 2008-004603 A1 06/03/200 US 2008-004603 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 20/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071289 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192523 A1 31/12/200 US 20					
KR 10-2013-0076825 A 08/07/201 KR 10-2013-0085952 A 30/07/201 KR 10-2013-0108091 A 02/10/201 KR 10-2014-0091039 A 18/07/201 KR 10-2014-0096342 A 05/08/201 US 2007-0283970 A1 13/12/200 US 2007-0287884 A1 13/12/200 US 2007-0287899 A1 13/12/200 US 2007-0287899 A1 13/12/200 US 2008-004603 A1 03/01/200 US 2008-0058861 A1 06/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200					
KR 10-2013-0085952 A					
KR 10-2013-0108091 A 02/10/201					
KR 10-2014-0091039 A 18/07/201 KR 10-2014-0096342 A 05/08/201 US 2007-0283970 A1 13/12/200 US 2007-0287884 A1 13/12/200 US 2007-0287889 A1 13/12/200 US 2007-0287992 A1 13/12/200 US 2008-0004603 A1 03/01/200 US 2008-0065861 A1 06/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071290 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2008-0071290 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200					
KR 10-2014-0096342 A 05/08/201 US 2007-0283970 A1 13/12/200 US 2007-0287884 A1 13/12/200 US 2007-0287889 A1 13/12/200 US 2007-0287992 A1 13/12/200 US 2008-0004603 A1 03/01/200 US 2008-0065861 A1 06/03/200 US 2008-0065997 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071290 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2008-0071290 A1 30/07/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326518 A1 31/12/200					
US 2007-0283970 A1 13/12/200 US 2007-0287884 A1 13/12/200 US 2007-0287889 A1 13/12/200 US 2007-0287992 A1 13/12/200 US 2008-0004603 A1 03/01/200 US 2008-0058861 A1 06/03/200 US 2008-0064921 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200					
US 2007-0287884 A1 13/12/200 US 2007-0287889 A1 13/12/200 US 2007-0287992 A1 13/12/200 US 2008-0004603 A1 03/01/200 US 2008-0058861 A1 06/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200					
US 2007-0287889 A1 13/12/200 US 2007-0287992 A1 13/12/200 US 2008-0004603 A1 03/01/200 US 2008-0058861 A1 06/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 30/07/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200					
US 2007-0287992 A1 13/12/200 US 2008-004603 A1 03/01/200 US 2008-0058861 A1 06/03/200 US 2008-0064921 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065100 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/12/2007	
US 2008-0058861 A1 06/03/200 US 2008-0064921 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/12/2007	
US 2008-0058861 A1 06/03/200 US 2008-0064921 A1 13/03/200 US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200			US 2008-0004603 A1	03/01/2008	
US 2008-0065097 A1 13/03/200 US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				06/03/2008	
US 2008-0065099 A1 13/03/200 US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200			US 2008-0064921 A1	13/03/2008	
US 2008-0065102 A1 13/03/200 US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200			US 2008-0065097 A1	13/03/2008	
US 2008-0065103 A1 13/03/200 US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0065105 A1 13/03/200 US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0065107 A1 13/03/200 US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0065108 A1 13/03/200 US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0065109 A1 13/03/200 US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0065110 A1 13/03/200 US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0071289 A1 20/03/200 US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200				13/03/2008	
US 2008-0071290 A1 20/03/200 US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200					
US 2009-0192523 A1 30/07/200 US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200					
US 2009-0192524 A1 30/07/200 US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200					
US 2009-0326318 A1 31/12/200 US 2009-0326553 A1 31/12/200					
US 2009-0326553 A1 31/12/200					
03 2003 0320300 AT 31/12/200					
			00 2000 0020000 MI	01, 12, 2000	

Information on patent family members

International application No.

US 2010-0274087 A1 28,10/. US 2011-0040305 A1 17/02/. US 2011-0040404 A1 17/02/. US 2011-0071508 A1 24/03/. US 2011-022808 A1 29/09/. US 2011-0238081 A1 29/09/. US 2011-0277776 A1 17/11/. US 2011-0277776 A1 17/11/. US 2011-028235 A1 17/11/. US 2011-0313428 A1 22/12/. US 2012-002553 A1 26/01/. US 2012-006366 A1 26/01/. US 2012-006366 A1 05/04/. US 2012-0039392 A1 08/03/. US 2012-0039392 A1 08/03/. US 2012-0039386 A1 08/08/. US 2013-005368 A1 28/02/. US 2013-0144116 A1 06/06/. US 2013-0197541 A1 01/08/. US 2013-0231680 A1 05/09/. US 2013-0317306 A1 28/11/. US 2013-0317306 A1 28/11/. US 2013-0317306 A1 28/11/. US 2013-0317309 A1 28/11/. US 2014-0206364 A1 05/09/. US 2013-0317309 A1 28/11/. US 2014-0206367 A1 06/10/. US 2013-0317309 A1 28/11/. US 2014-0206367 A1 06/10/. US 2013-0317309 A1 28/11/. US 2014-0206367 A1 06/10/. US 2015-035767 A1 26/02/. US 2015-035767 A1 18/06/. US 2015-035815 A1 29/10/. US 2015-035815 A1 29/10/. US 2016-0225186 A1 18/08/. US 2016-0225186 A1 18/08/. US 2016-0225186 A1 18/08/. US 2016-0235186 A1 18/08/. US 2016-0235186 A1 18/08/. US 2016-0235186 A1 18/08/. US 2016-024880 A1 25/08/. US 2016-024880 A1 25/08/. US 2016-025186 A1 18/08/. US 2016-024880 A1 25/08/.	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0274087 A1			US 2010-0198232 A1	05/08/2010
US 2011-0040404 A1 17/02/ US 2011-0071508 A1 24/03/ US 2011-022068 A1 24/03/ US 2011-0238081 A1 29/09/ US 2011-0277775 A1 17/11/ US 2011-0282351 A1 17/11/ US 2011-0282351 A1 17/11/ US 2011-0282353 A1 17/11/ US 2011-0282356 A1 17/11/ US 2011-0282358 A1 17/11/ US 2011-0282358 A1 17/11/ US 2011-0282358 A1 17/11/ US 2011-0282359 A1 17/11/ US 2011-0282359 A1 17/11/ US 2011-0282359 A1 17/11/ US 2011-0382359 A1 17/11/ US 2012-002553 A1 26/01/ US 2012-002553 A1 26/01/ US 2012-0046609 A1 23/02/ US 2012-0059391 A1 08/03/ US 2012-0059392 A1 08/03/ US 2012-0059392 A1 08/03/ US 2012-0059392 A1 08/03/ US 2012-0221011 A1 30/08/ US 2013-0053686 A1 26/04/ US 2013-0053686 A1 28/02/ US 2013-014116 A1 01/08/ US 2013-0226197 A1 29/08/ US 2013-0226197 A1 29/08/ US 2013-0226197 A1 29/08/ US 2013-0317309 A1 28/11/ US 2013-0365489 A1 27/02/ US 2014-0326254 A1 06/11/ US 2015-0166597 A1 15/05/ US 2015-0166597 A1 16/06/ US 2015-0266625 A1 24/12/ US 2015-036815 A1 29/10/ US 2015-036815 A1 29/10/ US 2015-036815 A1 29/10/ US 2015-036815 A1 29/10/ US 2016-0045272 A1 18/02/			US 2010-0274087 A1	28/10/2010
US 2011-0071508 A1				17/02/2011
US 2011-0202068 A1 28/08/1 US 2011-0238081 A1 28/08/1 US 2011-0277775 A1 17/11/1 US 2011-0277776 A1 17/11/1 US 2011-0282351 A1 17/11/1 US 2011-0282351 A1 17/11/1 US 2011-0282357 A1 17/11/1 US 2011-0282358 A1 17/11/1 US 2011-0282358 A1 17/11/1 US 2011-0282358 A1 17/11/1 US 2011-0282359 A1 17/11/1 US 2012-0025533 A1 26/01/1 US 2012-0059391 A1 08/03/1 US 2012-0059391 A1 08/03/1 US 2012-0059392 A1 08/03/1 US 2012-0059392 A1 08/03/1 US 2012-0203271 A1 09/08/1 US 2013-023271 A1 30/08/1 US 2013-023271 A1 30/08/1 US 2013-0214116 A1 06/06/1 US 2013-0214116 A1 06/06/1 US 2013-0213680 A1 28/02/1 US 2013-021697 A1 29/08/1 US 2013-0231680 A1 05/09/1 US 2013-0231680 A1 28/11/1 US 2014-0205936 A1 28/11/1 US 2014-0205936 A1 28/11/1 US 2014-0205936 A1 28/11/1 US 2014-0205936 A1 24/07/1 US 2014-0206936 A1 24/07/1 US 2014-0206936 A1 24/07/1 US 2015-00567677 A1 26/02/1 US 2015-0057677 A1 26/02/1 US 2015-00567673 A1 18/06/1 US 2015-025646 A1 10/08/1 US 2015-025646 A1 10/08/1 US 2015-0305815 A1 29/10/1				17/02/2011
US 2011-0238081 A1 29/09/3 US 2011-0277775 A1 17/11/1 US 2011-0277776 A1 17/11/1 US 2011-0282351 A1 17/11/1 US 2011-0282351 A1 17/11/1 US 2011-0282356 A1 17/11/1 US 2011-0282358 A1 17/11/1 US 2011-0282359 A1 17/11/1 US 2011-0282359 A1 17/11/1 US 2011-0282359 A1 17/11/1 US 2011-0282359 A1 17/11/1 US 2011-0313428 A1 22/12/1 US 2012-0059391 A1 08/03/1 US 2012-0059391 A1 08/03/1 US 2012-0059392 A1 08/03/1 US 2012-0059392 A1 08/03/1 US 2012-003271 A1 09/08/1 US 2013-0203271 A1 09/08/1 US 2013-0203271 A1 09/08/1 US 2013-0214116 A1 06/06/1 US 2013-0214116 A1 06/06/1 US 2013-0231680 A1 05/09/1 US 2013-0231680 A1 05/09/1 US 2013-0231680 A1 05/09/1 US 2013-0317306 A1 28/11/1 US 2013-0317309 A1 28/11/1 US 2014-0055489 A1 27/02/1 US 2014-0055489 A1 15/05/1 US 2014-022021 A1 07/08/1 US 2014-022021 A1 07/08/1 US 2014-022021 A1 07/08/1 US 2015-0056793 A1 06/11/1 US 2015-0056793 A1 05/03/1 US 2015-0056793 A1 06/11/1 US 2015-0056793 A1 06/11/1 US 2015-0056793 A1 06/11/1 US 2015-0250546 A1 06/11/1 US 2015-0250546 A1 06/11/1 US 2015-0250546 A1 06/11/1 US 2015-0250546 A1 06/11/1 US 2015-0305815 A1 29/10/1 US 2016-006773 A1 18/06/1 US 2015-0305815 A1 29/10/1 US 2016-006773 A1 18/06/1 US 2016-006773 A1 18/06/1 US 2016-006773 A1 18/06/1 US 2016-006773 A1 18/06/1 US 2016-0068512 A1 03/03/1 US 2016-006773 A1 18/06/1 US 2016-0068625 A1 24/12/1 US 2016-006877 A1 18/06/1 US 2016-0088512 A1 03/03/1 US 2016-006773 A1 18/06/1 US 2016-0068612 A1 18/08/1 US 2016-0088612 A1 18/08/1				24/03/2011
US 2011-0277775 A1 17/11/19				18/08/2011
US 2011-0277776 A1 17/11/2 US 2011-0282351 A1 17/11/2 US 2011-0282356 A1 17/11/2 US 2011-0282357 A1 17/11/2 US 2011-0282358 A1 17/11/2 US 2012-0025353 A1 26/01/2 US 2012-0059391 A1 26/01/2 US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0030354 A1 06/04/2 US 2012-0203271 A1 09/08/2 US 2013-02371 A1 09/08/2 US 2013-0313-035868 A1 28/02/2 US 2013-044116 A1 06/06/2 US 2013-044116 A1 06/06/2 US 2013-0317306 A1 29/08/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0056489 A1 15/05/2 US 2014-020936 A1 24/07/2 US 2014-0206936 A1 06/08/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 18/06/2 US 2015-0366815 A1 10/09/2 US 2015-0366825 A1 24/02/2 US 2015-0366625 A1 24/02/2 US 2015-0366625 A1 24/02/2 US 2015-0366625 A1 24/02/2 US 2016-0045272 A1 18/02/2				29/09/2011
US 2011-0282351 A1 17/11/2 US 2011-0282356 A1 17/11/2 US 2011-0282358 A1 17/11/2 US 2011-0282358 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0382359 A1 17/11/2 US 2011-0313428 A1 22/12/2 US 2012-002553 A1 26/01/2 US 2012-002553 A1 26/01/2 US 2012-002553 A1 26/01/2 US 2012-0059391 A1 26/01/2 US 2012-0059392 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0083654 A1 05/04/2 US 2012-0203271 A1 09/08/3 US 2012-023271 A1 09/08/2 US 2013-036368 A1 06/06/2 US 2013-036368 A1 06/06/2 US 2013-036368 A1 06/06/2 US 2013-026197 A1 29/08/2 US 2013-026197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0056489 A1 27/02/2 US 2014-026936 A1 24/07/2 US 2015-0056797 A1 26/02/2 US 2015-0057677 A1 26/02/2				
US 2011-0282356 A1 17/11/2 US 2011-0282357 A1 17/11/2 US 2011-0282357 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2012-0022553 A1 26/01/2 US 2012-0046669 A1 22/2/2/2 US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0023271 A1 09/08/2 US 2012-0221011 A1 30/08/2 US 2013-0023686 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0144116 A1 06/06/2 US 2013-0144116 A1 06/06/2 US 2013-0226197 A1 29/08/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0135792 A1 15/05/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 06/11/2 US 2014-022021 A1 06/11/2 US 2014-026036 A1 06/11/2 US 2015-0056797 A1 26/02/2 US 2015-0164597 A1 18/06/2 US 2015-0164597 A1 18/06/2 US 2015-0297300 A1 28/10/2 US 2015-0305815 A1 19/10/2 US 2015-0305815 A1 18/06/2 US 2015-0305815 A1 18/06/2 US 2015-0305815 A1 29/10/2 US 2015-0305815 A1 29/10/2 US 2016-0045272 A1 18/02/2				
US 2011-0282358 A1 17/11/2 US 2011-0282358 A1 17/11/2 US 2011-0282358 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0313428 A1 22/12/2 US 2012-0022553 A1 26/01/2 US 2012-0046669 A1 23/02/2 US 2012-0059391 A1 08/03/2 US 2012-0036654 A1 06/04/2 US 2012-0036654 A1 06/04/2 US 2012-0023271 A1 09/08/2 US 2013-0053868 A1 28/02/2 US 2013-0053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0056777 A1 26/02/2 US 2015-0056793 A1 06/11/2 US 2015-0056793 A1 06/01/2 US 2015-005689 A1 04/06/2 US 2015-036682 A1 04/06/2 US 2015-036682 A1 22/10/2 US 2015-0356815 A1 22/10/2 US 2015-0356625 A1 24/12/2 US 2015-0356625 A1 24/12/2 US 2016-0045272 A1 18/08/2 US 2016-0045272 A1 10/03/2				17/11/2011
US 2011-0282358 A1 17/11/2 US 2011-0282359 A1 17/11/2 US 2011-0313428 A1 22/12/2 US 2012-0022533 A1 26/01/2 US 2012-002533 A1 26/01/2 US 2012-0046699 A1 23/02/2 US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0083654 A1 05/04/2 US 2012-0203271 A1 09/08/2 US 2013-0053868 A1 28/02/2 US 2013-0053868 A1 28/02/2 US 2013-0197541 A1 01/08/2 US 2013-021697 A1 29/08/2 US 2013-021680 A1 05/09/2 US 2013-021680 A1 05/09/2 US 2013-0317309 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0055489 A1 27/02/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 06/11/2 US 2014-022021 A1 06/11/2 US 2014-025936 A1 24/07/2 US 2014-0256936 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 18/06/2 US 2015-0150639 A1 04/06/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/06/2 US 2015-035815 A1 22/10/2 US 2016-0045272 A1 18/06/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0058512 A1 03/03/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0045272 A1 18/02/2 US 2016-0045273 A1 10/03/2 US 2016-004527466 A1 10/03/2				17/11/2011
US 2011-0282359 A1 17/11/2 US 2011-0313428 A1 22/12/2 US 2012-002553 A1 26/01/2 US 2012-0046669 A1 23/02/2 US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0083654 A1 05/04/2 US 2012-0203271 A1 09/08/2 US 2012-0221011 A1 30/08/2 US 2013-053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0231680 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0206936 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0206936 A1 24/07/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 06/11/2 US 2015-0150639 A1 08/03/2 US 2015-0150639 A1 08/03/2 US 2015-0150639 A1 08/03/2 US 2015-050566 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2016-0058512 A1 18/06/2 US 2016-0305815 A1 29/10/3 US 2016-0058512 A1 18/02/2 US 2016-0058512 A1 10/03/2 US 2016-0058512 A1 10/03/2 US 2016-0058512 A1 10/03/2 US 2016-035486 A1 18/08/2				17/11/2011
US 2012-0022553 A1 26/01/2 US 2012-0046669 A1 23/02/2 US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-0083654 A1 05/04/2 US 2012-0220271 A1 09/08/2 US 2013-002368 A1 28/02/2 US 2013-0053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0226197 A1 01/08/2 US 2013-0226197 A1 09/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0206936 A1 24/07/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-005793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/3 US 2016-0058512 A1 30/03/2 US 2016-0058512 A1 10/09/3 US 2016-0058512 A1 10/03/3 US 2016-0058512 A1 10/03/3 US 2016-0058512 A1 10/03/3 US 2016-0058512 A1 10/03/3 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2				17/11/2011
US 2012-0046669 A1			US 2011-0313428 A1	22/12/2011
US 2012-0059391 A1 08/03/2 US 2012-0059392 A1 08/03/2 US 2012-003654 A1 05/04/3 US 2012-0203271 A1 09/08/2 US 2012-0203271 A1 09/08/2 US 2013-053868 A1 28/02/2 US 2013-0197541 A1 01/08/2 US 2013-0197541 A1 01/08/2 US 2013-026197 A1 29/08/2 US 2013-021680 A1 05/09/3 US 2013-021680 A1 05/09/3 US 2013-0317306 A1 28/11/2 US 2014-0055489 A1 27/02/3 US 2014-0055489 A1 27/02/3 US 2014-026936 A1 24/07/3 US 2014-022021 A1 07/08/3 US 2014-022021 A1 07/08/3 US 2014-036564 A1 06/11/3 US 2015-0057677 A1 26/02/3 US 2015-0056793 A1 05/03/3 US 2015-0150639 A1 04/06/3 US 2015-0150639 A1 04/06/3 US 2015-0297300 A1 22/10/3 US 2015-0305815 A1 29/10/3 US 2015-0305815 A1 29/10/3 US 2015-0305815 A1 29/10/3 US 2016-0045272 A1 18/08/3 US 2016-0066773 A1 10/03/3 US 2016-0066773 A1 10/03/3 US 2016-0066773 A1 10/03/3 US 2016-0066773 A1 10/03/3 US 2016-0035812 A1 03/03/3 US 2016-004577467 A1 29/12/3 US 2016-00374767 A1 29/12/3				26/01/2012
US 2012-0059392 A1 08/03/2 US 2012-0083654 A1 05/04/4 US 2012-0203271 A1 09/08/2 US 2013-0053868 A1 28/02/2 US 2013-0197541 A1 01/08/2 US 2013-0197541 A1 01/08/2 US 2013-0216180 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-026936 A1 24/07/2 US 2014-026936 A1 06/01/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 06/01/2 US 2015-0164597 A1 05/03/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 22/10/2 US 2015-0305815 A1 22/10/2 US 2015-0305815 A1 22/10/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-006773 A1 10/03/2 US 2016-0045272 A1 18/02/2 US 2016-006773 A1 10/03/2 US 2016-0035816 A1 22/10/2 US 2016-0035816 A1 29/10/3 US 2016-0045776 A1 18/08/2 US 2016-0045776 A1 18/08/2				23/02/2012
US 2012-0083654 A1				08/03/2012
US 2012-0203271 A1 09/08/2 US 2012-0221011 A1 30/08/2 US 2013-053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317306 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 07/08/2 US 2014-0365793 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-005793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0242860 A1 18/08/2				08/03/2012
US 2012-0221011 A1 30/08/2 US 2013-0053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0055489 A1 27/02/2 US 2014-0206936 A1 24/07/2 US 2014-022021 A1 07/08/2 US 2014-022021 A1 07/08/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 04/06/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0066773 A1 18/08/2 US 2016-0058512 A1 03/03/2 US 2016-0058512 A1 03/03/2 US 2016-0242860 A1 15/08/2 US 2016-0235486 A1 18/08/2				05/04/2012
US 2013-0053868 A1 28/02/2 US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0206936 A1 24/07/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-065793 A1 05/03/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2016-0045272 A1 18/02/2 US 2016-0045274 A1 18/08/2 US 2016-0045275 A1 18/02/2 US 2016-0045276 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2				
US 2013-0144116 A1 06/06/2 US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-022021 A1 07/08/2 US 2014-0222021 A1 07/08/2 US 2014-0222021 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2016-0045272 A1 18/02/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2				
US 2013-0197541 A1 01/08/2 US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0355489 A1 27/02/2 US 2014-036936 A1 24/07/2 US 2014-02202021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2016-00458512 A1 03/03/2 US 2016-00458512 A1 03/03/2 US 2016-00458512 A1 03/03/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 29/12/2 US 2016-0242860 A1 29/12/2 US 2016-0374767 A1 29/12/2				06/06/2013
US 2013-0226197 A1 29/08/2 US 2013-0231680 A1 05/09/2 US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2				01/08/2013
US 2013-0317306 A1 28/11/2 US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-022021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0056793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0150639 A1 18/06/2 US 2015-0297300 A1 22/10/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0305815 A1 29/10/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0058512 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-02374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2				29/08/2013
US 2013-0317309 A1 28/11/2 US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0220936 A1 24/07/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-005793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0150639 A1 04/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 22/10/2 US 2015-0306625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0058512 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2				05/09/2013
US 2014-0055489 A1 27/02/2 US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0150639 A1 05/03/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0250546 A1 10/09/2 US 2015-0305815 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0066773 A1 10/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2			US 2013-0317306 A1	28/11/2013
US 2014-0135792 A1 15/05/2 US 2014-0206936 A1 24/07/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2				28/11/2013
US 2014-0206936 A1 24/07/2 US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2				27/02/2014
US 2014-0222021 A1 07/08/2 US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0045272 A1 18/02/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 16/03/2				15/05/2014
US 2014-0326254 A1 06/11/2 US 2015-0057677 A1 26/02/2 US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0305815 A1 29/10/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 16/03/2				24/07/2014
US 2015-0057677 A1 26/02/2 US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0235486 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				
US 2015-0065793 A1 05/03/2 US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0235486 A1 18/08/2 US 2016-0235486 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				26/02/2015
US 2015-0150639 A1 04/06/2 US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				05/03/2015
US 2015-0164597 A1 18/06/2 US 2015-0250546 A1 10/09/2 US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				04/06/2015
US 2015-0297300 A1 22/10/2 US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				18/06/2015
US 2015-0305815 A1 29/10/2 US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				10/09/2015
US 2015-0366625 A1 24/12/2 US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				22/10/2015
US 2016-0045272 A1 18/02/2 US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				29/10/2015
US 2016-0058512 A1 03/03/2 US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				24/12/2015
US 2016-0066773 A1 10/03/2 US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				18/02/2016
US 2016-0235486 A1 18/08/2 US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				03/03/2016
US 2016-0242860 A1 25/08/2 US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				18/08/2016
US 2016-0374767 A1 29/12/2 US 2017-071628 A1 16/03/2				25/08/2016
US 2017-071628 A1 16/03/2				29/12/2016
				16/03/2017
				25/05/2010

Information on patent family members

International application No.

Patent document	Publication	Patent family	Publication	
	date	member(s)	date	
cited in search report	aute	memoer(s)	uale	
		W0. 70 100 20 D0	17/05/0011	
		US 7942868 B2	17/05/2011	
		US 7967813 B2	28/06/2011	
		US 8029516 B2	04/10/2011	
		US 8057385 B2	15/11/2011	
		US 8062211 B2	22/11/2011	
		US 8083667 B2	27/12/2011	
		US 8182415 B2	22/05/2012	
		US 8377045 B2	19/02/2013	
		US 8377046 B2 US 8419717 B2	19/02/2013	
		US 8419717 B2 US 8517933 B2	16/04/2013	
		US 8517933 B2 US 8551076 B2	27/08/2013	
		US 8597280 B2	08/10/2013	
		US 8597280 B2 US 8620473 B2	03/12/2013	
		US 8672833 B2	31/12/2013 18/03/2014	
		US 8679099 B2	25/03/2014	
		US 8740885 B2	03/06/2014	
		US 8746252 B2	10/06/2014	
		US 8771180 B2	08/07/2014	
		US 8784435 B2	22/07/2014	
		US 8852208 B2	07/10/2014	
		US 8864652 B2	21/10/2014	
		US 8864752 B2	21/10/2014	
		US 8903546 B2	02/12/2014	
		US 8918211 B2	23/12/2014	
		US 8945148 B2	03/02/2015	
		US 8986196 B2	24/03/2015	
		US 9060678 B2	23/06/2015	
		US 9084623 B2	21/07/2015	
		US 9089256 B2	28/07/2015	
		US 9096033 B2	04/08/2015	
		US 9138129 B2	22/09/2015	
		US 9173547 B2	03/11/2015	
		US 9215967 B2	22/12/2015	
		US 9283049 B2	15/03/2016	
		US 9301807 B2	05/04/2016	
		US 9320416 B2	26/04/2016	
		US 9333042 B2	10/05/2016	
		US 9345387 B2	24/05/2016	
		US 9469034 B2	18/10/2016	
		US 9492927 B2	15/11/2016	
		US 9510734 B2	06/12/2016	
		US 9516996 B2	13/12/2016	
		US 9622826 B2	18/04/2017	
		US 9629520 B2	25/04/2017	
		US 9636000 B2	02/05/2017	
		US 9717563 B2	01/08/2017	
		US 9718190 B2	01/08/2017	
		HC 07041C0 D0	00/00/0017	
		US 9724169 B2 WO 2007-146984 A2	08/08/2017 21/12/2007	

Information on patent family members

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2007-146984 A3	24/04/2008
		WO 2007-146987 A2	21/12/2007
		WO 2007-146987 A3	20/11/2008
		WO 2008-002830 A2	03/01/2008
		WO 2008-002830 A3	24/04/2008
		WO 2009-158164 A1 WO 2010-039394 A1	30/12/2009 08/04/2010
		WO 2010 039394 A1 WO 2010-117684 A1	14/10/2010
		WO 2010-117685 A2	14/10/2010
		WO 2010-117685 A3	24/02/2011
		WO 2010-151438 A1	29/12/2010
		WO 2011-143016 A1	17/11/2011
		WO 2011-143020 A1	17/11/2011
		WO 2011-143021 A1	17/11/2011
		WO 2011-143022 A1	17/11/2011
		WO 2011-143023 A1	17/11/2011
		WO 2011-143024 A1 WO 2011-143338 A1	17/11/2011 17/11/2011
		WO 2011-143338 A1 WO 2013-071057 A1	16/05/2013
		WO 2013-071071 A1	16/05/2013
			,,
US 2013-0338679 A1	19/12/2013	CA 2813403 A1	07/04/2011
		EP 2020944 A1	11/02/2009
		EP 2020944 B1	08/07/2015
		EP 2482746 A1	08/08/2012
		US 2009-0209976 A1 US 2012-0245596 A1	20/08/2009 27/09/2012
		US 2015-0245875 A1	03/09/2015
		US 2016-0346052 A1	01/12/2016
		US 8512353 B2	20/08/2013
		US 9060795 B2	23/06/2015
		US 9655681 B2	23/05/2017
		WO 2007-133065 A1	22/11/2007
		WO 2011-040813 A1	07/04/2011
EP 1625863 A2	15/02/2006	AU 7279798 A	27/11/1998
		CA 2289101 A1	12/11/1998
		CA 2289101 C	18/07/2006
		EP 1015048 A1	05/07/2000
		EP 1015048 B1	09/11/2005
		EP 1625863 A3	01/03/2006
		EP 1625863 B1 EP 1849489 A2	08/08/2007
		EP 1849489 A2 EP 1849489 A3	31/10/2007 28/11/2007
		EP 1849489 B1	07/10/2009
		JP 2001-525693 A	11/12/2001
		JP 2007-330805 A	27/12/2007
		JP 2010-148896 A	08/07/2010
		JP 4485554 B2	23/06/2010
		US 2002-0156432 A1	24/10/2002

Information on patent family members

International application No.

			0.52017/054176	
Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
		US 2004-0059297 A1 US 2004-0111060 A1 US 2009-0314422 A1 US 2009-0318868 A1 US 2011-0021878 A1 US 2012-0150120 A1 US 2014-0171744 A1 US 6702787 B2 US 7282043 B2 US 7896846 B2 US 8002934 B2 US 8192405 B2 US 8702657 B2 WO 98-50093 A1	25/03/2004 10/06/2004 24/12/2009 24/12/2009 27/01/2011 14/06/2012 19/06/2014 09/03/2004 16/10/2007 01/03/2011 23/08/2011 05/06/2012 18/09/2012 22/04/2014 12/11/1998	