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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/799,045	10/31/2017	Robert Dean King	273252-US-8

CONFIRMATION NO. 9433

27571
Ascenda Law Group, PC
2150 N First Street
Suite 420
San Jose, CA 95131

POA ACCEPTANCE LETTER

OC000000087698873

Date Mailed: 04/24/2025

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/22/2025.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sltorres/

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15/799,045	10/31/2017	Robert Dean King	273252-US-8

CONFIRMATION NO. 9433

131278
Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

POWER OF ATTORNEY NOTICE

OC000000087698885

Date Mailed: 04/24/2025

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/22/2025.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sltorres/

REVOCATION OF PREVIOUS POWERS OF ATTORNEY WITH NEW GENERAL POWER OF ATTORNEY TO PROSECUTE APPLICATIONS AND REEXAMINATION PROCEEDINGS BEFORE THE UNITED STATES PATENT AND TRADEMARK OFFICE

I hereby revoke all previous powers of attorney given in the application(s), reexamination proceeding(s) and/or patent(s) listed below and appoint:

	Practitioners associated with the Customer Number	27571	

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications and reexamination proceedings assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application(s), reexamination proceeding(s) and/or patent(s) listed below to the address associated with Customer Number 27571.

Assignee Name and Address:

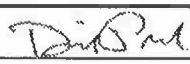
Edison Innovations, LLC
812 W. McDermott Dr. #1106
Allen, TX 75013

A statement under 37 CFR 3.73 is attached.

List of application(s), reexamination proceeding(s) and/or patent(s):

See attached list

SIGNATURE OF ASSIGNEE OF RECORD
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date: 2/19/25
Name	David Pridham	Telephone: 214-414-1164
Title	CEO	

Annex A (Listed Patents)

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
124281-US-1	US	12/18/2003	US10/707496	US7262520	8/28/2007	Robust power distribution systems and methods	Dolby Intellectual Property Licensing, LLC	Active
133987-AU-3	AU	11/18/2004	AU2004295321A	AU2004295321	1/6/2011	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-BR-4	BR	11/18/2004	BRPI0416414A	BRPI0416414	1/9/2007	Method and device for producing a tensile stress	Dolby Intellectual Property Licensing, LLC	Active
133987-CA-5	CA	11/18/2004	CA2545552A	CA2545552	7/9/2013	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-CN-6	CN	11/18/2004	CN200480034845A	CN1886282	1/11/2012	Method and apparatus for producing traction effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-DE-13	DE	11/18/2004	EP04811389A	EP1697158	10/17/2007	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-FR-12	FR	11/18/2004	EP04811389A	EP1697158	10/17/2007	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-IN-8	IN	5/11/2006	IN2659DEN2006A	IN301119	9/21/2018	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-IT-14	IT	11/18/2004	EP04811389A	EP1697158	10/17/2007	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-MX-9	MX	11/18/2004	MXPA06005959A	MXPA06005959	7/6/2006	Method and apparatus for producing tractive effort.	Dolby Intellectual Property Licensing, LLC	Expired
133987-RU-10	RU	11/18/2004	RU2006122531A	RU2348546	3/10/2009	Traction method and mechanism	Dolby Intellectual Property Licensing, LLC	Expired
133987-US-1	US	11/25/2003	US10/723572	US7489093	2/10/2009	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Active
133987-ZA-11	ZA	6/9/2006	ZA200604790A	ZA200604790	10/31/2007	Method and apparatus for producing tractive effort	Dolby Intellectual Property Licensing, LLC	Expired
134730-JP-2	JP	3/29/2005	JP2005093545A	JP4871520	2/8/2012	High density connection between multiple circuit boards	Dolby Intellectual Property Licensing, LLC	Active
145823-BR-3	BR	11/9/2005	BRPI0504935A	BRPI0504935	2/27/2018	â€œelectric ignition generating system"	Dolby Intellectual Property Licensing, LLC	Active
145823-DE-8	DE	11/10/2005	EP05256964A	EP1657807	6/5/2019	Bidirectional buck-boost power converter	Dolby Intellectual Property Licensing, LLC	Active
145823-EP-2	EP	11/10/2005	EP05256964A	EP1657807	6/5/2019	Bidirectional buck-boost power converter	Dolby Intellectual Property Licensing, LLC	Active
145823-JP-5	JP	11/1/2005	JP2005318000A	JP4870968	2/8/2012	Bidirectional buck-boost power converter, electric starter generator using bidirectional buck-boost power converter, and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
145823-US-6	US	12/4/2007	US11/949963	US8138694	3/20/2012	Bidirectional buck-boost power converters	Dolby Intellectual Property Licensing, LLC	Active
146125-DE-5	DE	8/25/2005	EP05792879A	EP1784444	8/13/2014	Crosslinkable and crosslinked polymers	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
146125-GB-6	GB	8/25/2005	EP05792879A	EP1784444	8/13/2014	Crosslinkable and crosslinked polymers	Dolby Intellectual Property Licensing, LLC	Active
146125-JP-4	JP	8/25/2005	JP2007530158A	JP5341349	11/13/2013	Crosslinkable and cross-linked polymers	Dolby Intellectual Property Licensing, LLC	Active
146125-NL-7	NL	8/25/2005	EP05792879A	EP1784444	8/13/2014	Crosslinkable and crosslinked polymers	Dolby Intellectual Property Licensing, LLC	Active
146125-US-1	US	8/27/2004	US10/928939	US7390857	6/24/2008	Crosslinkable and crosslinked polymers	Dolby Intellectual Property Licensing, LLC	Active
152861-CN-2	CN	9/13/2005	CN200510104181A	CN100565938	12/2/2009	Photovoltaic modules for solar concentrator	Dolby Intellectual Property Licensing, LLC	Active
152861-IT-4	IT	9/12/2005	ITMI20051676A	ITMI20051676	3/14/2006		Dolby Intellectual Property Licensing, LLC	Active
152861-US-1	US	9/13/2004	US10/939925	US7442871	10/28/2008	Photovoltaic modules for solar concentrator	Dolby Intellectual Property Licensing, LLC	Active
154645-US-1	US	11/24/2004	US10/996714	US7240353	7/3/2007	Functionality recommendation system	Dolby Intellectual Property Licensing, LLC	Active
155850-US-1	US	6/6/2005	US11/146875	US8039731	10/18/2011	Photovoltaic concentrator for solar energy system	Dolby Intellectual Property Licensing, LLC	Active
162163-US-1	US	12/15/2005	US11/303157	US7663456	2/16/2010	Micro-electromechanical system (mems) switch arrays	Dolby Intellectual Property Licensing, LLC	Active
162191-FR-7	FR	6/19/2007	EP07110554A	EP2017870	5/15/2013	Micro-electromechanical system based soft switching	Dolby Intellectual Property Licensing, LLC	Active
162191-JP-4	JP	6/12/2007	JP2007154931A	JP5149550	2/20/2013	Soft switching based on microelectromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
162191-US-1	US	12/20/2005	US11/314879	US7633725	12/15/2009	Micro-electromechanical system based soft switching	Dolby Intellectual Property Licensing, LLC	Active
162667-CN-3	CN	12/20/2006	CN200680050737A	CN101356071	1/2/2013	Hybrid vehicle and method of assembling same	Dolby Intellectual Property Licensing, LLC	Active
162667-IN-5	IN	6/25/2008	IN5533DEN2008A	IN285074	7/14/2017	Hybrid vehicle and method of assembling same	Dolby Intellectual Property Licensing, LLC	Active
162667-US-1	US	1/9/2006	US11/328051	US7780562	8/24/2010	Hybrid vehicle and method of assembling same	Dolby Intellectual Property Licensing, LLC	Active
162711-US-2	US	11/28/2006	US11/563726	US7876538	1/25/2011	Micro-electromechanical system based arc-less switching with circuitry for absorbing electrical energy during a fault condition	Dolby Intellectual Property Licensing, LLC	Active
163124-US-1	US	11/22/2005	US11/285122	US7453195	11/18/2008	White lamps with enhanced color contrast	Joint ownership - Dolby Intellectual Property Licensing, LLC with Current and Savant	Active
164314-US-1	US	10/19/2005	US11/254096	US8022416	9/20/2011	Functional blocks for assembly	Dolby Intellectual Property Licensing, LLC	Active
164314-US-3	US	10/19/2005	US11/254181	US7926176	4/19/2011	Methods for magnetically directed self assembly	Dolby Intellectual Property Licensing, LLC	Active
164415-US-4	US	4/10/2006	US11/401043	US8121192	2/21/2012	Method and system for treating noise in a generated image	Dolby Intellectual Property Licensing, LLC	Active
164467-US-2	US	11/18/2005	US11/283451	US7521732	4/21/2009	Vertical heterostructure field effect transistor and associated method	Dolby Intellectual Property Licensing, LLC	Active
176303-CN-3	CN	12/15/2006	CN200680050746A	CN101356707	7/11/2012	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
176303-DE-8	DE	12/15/2006	EP06847706A	EP1977495	11/24/2010	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176303-FR-7	FR	12/15/2006	EP06847706A	EP1977495	11/24/2010	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176303-GB-9	GB	12/15/2006	EP06847706A	EP1977495	11/24/2010	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176303-IN-5	IN	6/24/2008	IN5468DEN20 08A	IN313530	6/7/2019	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176303-JP-11	JP	5/11/2012	JP2012108971 A	JP5703258	4/15/2015	Energy storage system for electric or hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
176303-JP-14	JP	3/16/2017	JP2017050687 A	JP6462027	1/30/2019	Energy storage system for electric or hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
176303-JP-6	JP	12/15/2006	JP2008549486 A	JP5525731	6/18/2014	Energy storage system for electric or hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
176303-US-10	US	2/10/2011	US13/025102	USRE43956	2/5/2013	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176303-US-12	US	11/20/2012	US13/681686	USRE45431	3/24/2015	Energy storage system for electric or hybrid vehicle	Dolby Intellectual Property Licensing, LLC	Active
176918-US-2	US	3/15/2006	US11/376545	US7388695	6/17/2008	Data storage devices and methods	Dolby Intellectual Property Licensing, LLC	Active
176918-US-4	US	9/18/2007	US11/901725	US8808944	8/19/2014	Method for storing holographic data	Dolby Intellectual Property Licensing, LLC	Active
176918-US-5	US	6/17/2008	US12/140807	US8842351	9/23/2014	Data storage method and device	Dolby Intellectual Property Licensing, LLC	Active
177675-US-1	US	11/30/2005	US11/290951	US7750641	7/6/2010	Battery system and method for monitoring a battery	Dolby Intellectual Property Licensing, LLC	Active
177675-US-2	US	5/17/2010	US12/781495	US7847558	12/7/2010	Battery system for monitoring a battery	Dolby Intellectual Property Licensing, LLC	Active
181455-US-1	US	5/16/2007	US11/749174	US7626801	12/1/2009	Integrated inductor and capacitor components and methods of manufacture	Dolby Intellectual Property Licensing, LLC	Active
182854-US-1	US	4/4/2005	US11/097294	US7492810	2/17/2009	Method and apparatus for segmented code correlation	Dolby Intellectual Property Licensing, LLC	Active
183176-DE-8	DE	12/19/2007	EP07867811A	EP2095252	11/13/2019	Piggyback networks	Dolby Intellectual Property Licensing, LLC	Active
183176-EP-4	EP	12/19/2007	EP07867811A	EP2095252	11/13/2019	Piggyback networks	Dolby Intellectual Property Licensing, LLC	Active
183176-FR-7	FR	12/19/2007	EP07867811A	EP2095252	11/13/2019	Piggyback networks	Dolby Intellectual Property Licensing, LLC	Active
183176-GB-9	GB	12/19/2007	EP07867811A	EP2095252	11/13/2019	Piggyback networks	Dolby Intellectual Property Licensing, LLC	Active
183752-US-1	US	11/11/2005	US11/271711	US7734099	6/8/2010	Method and system for generating polygonal boundary definitions for image objects	Dolby Intellectual Property Licensing, LLC	Active
187674-AU-3	AU	5/26/2008	AU200820230 9A	AU2008202 309	11/20/2014	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
187674-CN-4	CN	5/26/2008	CN200810108 828A	CN10132075 9	12/26/2012	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
187674-DE-8	DE	5/21/2008	EP08156634A	EP1995791	7/22/2015	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
187674-ES-6	ES	5/21/2008	EP08156634A	EP1995791	7/22/2015	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
187674-IT-7	IT	5/21/2008	EP08156634A	EP1995791	7/22/2015	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
187674-US-2	US	5/9/2008	US12/151806	US8701360	4/22/2014	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
189292-CN-3	CN	1/5/2007	CN200780002160A	CN101370685	12/28/2011	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
189292-DE-8	DE	1/5/2007	EP07709593A	EP1976721	6/12/2019	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
189292-EP-4	EP	1/5/2007	EP07709593A	EP1976721	6/12/2019	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
189292-JP-6	JP	1/5/2007	JP2008549590A	JP5079709	11/21/2012	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
189292-US-1	US	1/9/2006	US11/328000	US7568537	8/4/2009	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
193892-US-1	US	9/28/2007	US11/863722	US7898176	3/1/2011	Fluidic thermal management article and method	Dolby Intellectual Property Licensing, LLC	Active
193892-US-2	US	9/28/2007	US11/863709	US8058802	11/15/2011	Thermal management article and method	Dolby Intellectual Property Licensing, LLC	Active
193892-US-3	US	9/28/2007	US11/863690	US7742673	6/22/2010	Thermal mangement article having thermal wave guide	Dolby Intellectual Property Licensing, LLC	Active
195378-US-2	US	6/22/2007	US11/767067	US7906092	3/15/2011	Methods for preparing compositions which comprise magnesium borohydride, and related materials	Dolby Intellectual Property Licensing, LLC	Active
197732-CA-4	CA	1/18/2007	CA2574470A	CA2574470	5/13/2014	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-CN-5	CN	1/18/2007	CN200710086047A	CN101003259	10/12/2011	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-DE-12	DE	1/18/2007	EP07100757A	EP1810861	8/11/2010	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-FR-11	FR	1/18/2007	EP07100757A	EP1810861	8/11/2010	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-GB-13	GB	1/18/2007	EP07100757A	EP1810861	8/11/2010	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-IN-7	IN	1/18/2007	IN116DE2007A	IN284145	6/16/2017	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-IT-14	IT	1/18/2007	EP07100757A	EP1810861	8/11/2010	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-JP-15	JP	11/19/2012	JP2012252813A	JP5619115	11/5/2014	Wheel propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-JP-8	JP	1/18/2007	JP2007008873A	JP5346437	11/20/2013	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
197732-US-2	US	12/21/2006	US11/614412	US7595597	9/29/2009	Vehicle propulsion system	Dolby Intellectual Property Licensing, LLC	Active
198520-US-1	US	10/6/2006	US11/539330	US7632425	12/15/2009	Composition and associated method	Dolby Intellectual Property Licensing, LLC	Active
205275-US-1	US	12/23/2008	US12/343288	US9093082	7/28/2015	Data storage devices and methods	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
205374-CN-2	CN	11/28/2007	CN200710305186A	CN101226835	2/22/2012	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-DE-8	DE	11/26/2007	EP07121542A	EP1928006	1/20/2010	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-FR-7	FR	11/26/2007	EP07121542A	EP1928006	1/20/2010	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-GB-9	GB	11/26/2007	EP07121542A	EP1928006	1/20/2010	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-JP-4	JP	11/27/2007	JP2007305386A	JP5421529	2/19/2014	Switching module based on micro-electromechanical system that can be stacked in series with its other module to satisfy voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-KR-5	KR	11/27/2007	KR20070121507A	KR101388747	4/25/2014	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205374-MX-6	MX	11/27/2007	MX2007014966A	MX2007014966	2/19/2009	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating.	Dolby Intellectual Property Licensing, LLC	Active
205374-US-1	US	11/28/2006	US11/563774	US7532835	2/19/2008	Micro-electromechanical system based switching module serially stackable with other such modules to meet a voltage rating	Dolby Intellectual Property Licensing, LLC	Active
205555-US-1	US	8/25/2006	US11/509397	US7313965	1/1/2008	High-temperature pressure sensor	Dolby Intellectual Property Licensing, LLC	Active
205932-US-1	US	12/23/2008	US12/343296	US8084168	12/27/2011	Holographic storage devices with complementary data layer and use thereof	Dolby Intellectual Property Licensing, LLC	Active
205979-AT-13	AT	8/5/2008	EP08161865A	EP2151362	10/10/2012	Method of operating a vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-CA-18	CA	8/1/2008	CA2901866A	CA2901866	11/7/2017	Method of operating vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-CA-2	CA	8/1/2008	CA2638479A	CA2638479	11/24/2015	Method of operating vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-DK-16	DK	8/5/2008	EP08161865A	EP2151362	10/10/2012	Method of operating a vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-ES-12	ES	8/5/2008	EP08161865A	EP2151362	10/10/2012	Method of operating a vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-FR-11	FR	8/5/2008	EP08161865A	EP2151362	10/10/2012	Method of operating a vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-NL-10	NL	8/5/2008	EP08161865A	EP2151362	10/10/2012	Method of operating a vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
205979-US-17	US	3/25/2014	US14/224992	US9248825	2/2/2016	Method of operating vehicle and associated system	Dolby Intellectual Property Licensing, LLC	Active
207792-DE-13	DE	9/16/2008	EP08164432A	EP2045823	8/16/2017	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
207792-FR-14	FR	9/16/2008	EP08164432A	EP2045823	8/16/2017	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
207792-GB-15	GB	9/16/2008	EP08164432A	EP2045823	8/16/2017	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
207792-IT-16	IT	9/16/2008	EP08164432A	EP2045823	8/16/2017	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
207792-JP-11	JP	7/25/2008	JP2008191824A	JP5340663	11/13/2013	System with circuitry for suppressing arc formation in microelectromechanical system based switches	Dolby Intellectual Property Licensing, LLC	Active
207792-KR-12	KR	10/2/2008	KR20080097287A	KR10146873	12/10/2014	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
207792-US-2	US	10/3/2007	US11/866849	US9076607	7/7/2015	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
208273-US-1	US	12/23/2008	US12/343289	US8182966	5/22/2012	Data storage devices and methods	Dolby Intellectual Property Licensing, LLC	Active
214912-US-1	US	12/6/2006	US11/634592	US8236200	8/7/2012	Nano-composite ir window and method for making same	Dolby Intellectual Property Licensing, LLC	Active
215038-DE-7	DE	11/26/2007	EP07121476A	EP1930922	8/9/2017	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215038-FR-8	FR	11/26/2007	EP07121476A	EP1930922	8/9/2017	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215038-GB-9	GB	11/26/2007	EP07121476A	EP1930922	8/9/2017	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215038-IT-10	IT	11/26/2007	EP07121476A	EP1930922	8/9/2017	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215038-JP-4	JP	12/4/2007	JP2007312956A	JP5215648	6/19/2013	Electromechanical switching circuit in parallel with a solid-state switching circuit that can be selectively switched to transmit a load current suitable for the circuit	Dolby Intellectual Property Licensing, LLC	Active
215038-KR-5	KR	12/5/2007	KR20070125518A	KR10140911 9	6/17/2014	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215038-MX-6	MX	11/21/2007	MX2007014563A	MX2007014 563	2/19/2009	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load current appropriate to such circuitry.	Dolby Intellectual Property Licensing, LLC	Active
215038-US-1	US	12/6/2006	US11/567296	US7643256	1/5/2010	Electromechanical switching circuitry in parallel with solid state switching circuitry selectively switchable to carry a load appropriate to such circuitry	Dolby Intellectual Property Licensing, LLC	Active
215502-US-1	US	7/31/2008	US12/183488	US7829652	11/9/2010	Polyarylether composition and membrane	Dolby Intellectual Property Licensing, LLC	Active

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215575-DE-8	DE	1/10/2008	EP08100318A	EP1944785	11/14/2018	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-EP-3	EP	1/10/2008	EP08100318A	EP1944785	11/14/2018	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-FR-7	FR	1/10/2008	EP08100318A	EP1944785	11/14/2018	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-GB-10	GB	1/10/2008	EP08100318A	EP1944785	11/14/2018	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-IT-9	IT	1/10/2008	EP08100318A	EP1944785	11/14/2018	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-JP-4	JP	1/10/2008	JP2008002778A	JP5172360	3/27/2013	Gate voltage control system and method for electrostatic actuation of microelectromechanical devices	Dolby Intellectual Property Licensing, LLC	Active
215575-KR-5	KR	1/10/2008	KR20080003059A	KR101442250	9/23/2014	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
215575-US-1	US	1/12/2007	US11/622483	US7473859	1/6/2009	Gating voltage control system and method for electrostatically actuating a micro-electromechanical device	Dolby Intellectual Property Licensing, LLC	Active
216634-US-1	US	2/13/2007	US11/705860	US7648649	1/19/2010	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
217591-US-1	US	6/28/2007	US11/769913	US7978402	7/12/2011	Robust window for infrared energy	Dolby Intellectual Property Licensing, LLC	Active
218806-US-1	US	9/4/2008	US12/204013	US8207813	6/26/2012	Electronic device and method	Dolby Intellectual Property Licensing, LLC	Active
219867-CN-8	CN	8/27/2009	CN200980100173A	CN101828285	4/3/2013	Composition, energy storage device, and method	Dolby Intellectual Property Licensing, LLC	Active
219867-US-2	US	12/9/2008	US12/330714	US8304110	11/6/2012	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
219868-US-3	US	6/28/2007	US11/769752	US7632604	12/15/2009	Energy storage device and method	Dolby Intellectual Property Licensing, LLC	Active
219869-AU-3	AU	5/7/2008	AU2008266715A	AU2008266715	1/17/2013	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-CN-4	CN	5/7/2008	CN200880015037A	CN101682015	3/27/2013	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-DE-9	DE	5/7/2008	EP08747755A	EP2162934	1/6/2021	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-EP-5	EP	5/7/2008	EP08747755A	EP2162934	1/6/2021	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-FR-8	FR	5/7/2008	EP08747755A	EP2162934	1/6/2021	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-GB-10	GB	5/7/2008	EP08747755A	EP2162934	1/6/2021	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active

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219869-JP-6	JP	5/7/2008	JP2010512231A	JP5570976	8/13/2014	Energy storage device and cell structure therenf	Dolby Intellectual Property Licensing, LLC	Active
219869-US-1	US	6/14/2007	US11/763083	US8110301	2/7/2012	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
219869-ZA-7	ZA	11/6/2009	ZA200907831A	ZA200907831	7/28/2010	Energy storage device and cell configuration therefor	Dolby Intellectual Property Licensing, LLC	Active
220217-US-1	US	5/7/2007	US11/745137	US8006626	8/30/2011	System and method for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220217-US-6	US	8/29/2011	US13/219954	US8720344	5/13/2014	Thermal management system and method	Dolby Intellectual Property Licensing, LLC	Active
220219-CN-3	CN	3/17/2008	CN200880023326A	CN101689683	3/27/2013	System and method for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220219-DE-6	DE	3/17/2008	EP08732331A	EP2147475	11/29/2017	System for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220219-FR-7	FR	3/17/2008	EP08732331A	EP2147475	11/29/2017	System for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220219-GB-8	GB	3/17/2008	EP08732331A	EP2147475	11/29/2017	System for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220219-JP-5	JP	3/17/2008	JP2010507491A	JP5491385	5/14/2014	System and method for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220219-US-1	US	5/7/2007	US11/745109	US7921946	4/12/2011	System and method for cooling a battery	Dolby Intellectual Property Licensing, LLC	Active
220569-US-1	US	1/8/2008	US11/971126	US8055596	11/8/2011	System and method for developing a propensity model	Dolby Intellectual Property Licensing, LLC	Active
220778-CN-3	CN	12/22/2008	CN200810185380A	CN101465242	12/14/2016	There is the mems switch that the standoff voltage of improvement controls	Dolby Intellectual Property Licensing, LLC	Active
220778-DE-7	DE	12/12/2008	EP08171425A	EP2073238	11/1/2017	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-FR-8	FR	12/12/2008	EP08171425A	EP2073238	11/1/2017	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-GB-9	GB	12/12/2008	EP08171425A	EP2073238	11/1/2017	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-IT-10	IT	12/12/2008	EP08171425A	EP2073238	11/1/2017	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-JP-5	JP	12/16/2008	JP2008319542A	JP5478060	4/23/2014	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-KR-6	KR	12/19/2008	KR20080130501A	KR101529731	6/17/2015	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220778-US-1	US	12/21/2007	US11/962178	US7692519	4/6/2010	Mems switch with improved standoff voltage control	Dolby Intellectual Property Licensing, LLC	Active
220787-CN-3	CN	12/22/2008	CN200810188424A	CN101533740	11/13/2013	Mems microswitch having a conductive mechanical stop	Dolby Intellectual Property Licensing, LLC	Active
220787-FR-7	FR	12/11/2008	EP08171380A	EP2073236	3/2/2011	Mems microswitch having a conductive mechanical stop	Dolby Intellectual Property Licensing, LLC	Active
220787-IT-10	IT	12/11/2008	EP08171380A	EP2073236	3/2/2011	Mems microswitch having a conductive mechanical stop	Dolby Intellectual Property Licensing, LLC	Active
220787-JP-5	JP	12/12/2008	JP2008316853A	JP5449756	3/19/2014	Mems switch with conductive mechanical stopper	Dolby Intellectual Property Licensing, LLC	Active

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220787-KR-6	KR	12/18/2008	KR20080129356A	KR101538169	7/20/2015	Mems microswitch having a conductive mechanical stop	Dolby Intellectual Property Licensing, LLC	Active
220787-US-1	US	12/20/2007	US11/961767	US7609136	10/27/2009	Mems microswitch having a conductive mechanical stop	Dolby Intellectual Property Licensing, LLC	Active
220822-JP-5	JP	10/28/2008	JP2008276338A	JP5372466	12/18/2013	System and method for avoiding contact sticking in microelectromechanical system based switches	Dolby Intellectual Property Licensing, LLC	Active
220822-KR-6	KR	10/30/2008	KR20080107293A	KR101514073	4/21/2015	System and method for avoiding contact stiction in microelectromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
220822-US-1	US	10/31/2007	US11/931353	US7808764	10/5/2010	System and method for avoiding contact stiction in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Active
220832-DE-8	DE	10/10/2008	EP08166371A	EP2050712	12/26/2018	Sealed wafer packaging of microelectromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
220832-EP-4	EP	10/10/2008	EP08166371A	EP2050712	12/26/2018	Sealed wafer packaging of microelectromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
220832-GB-9	GB	10/10/2008	EP08166371A	EP2050712	12/26/2018	Sealed wafer packaging of microelectromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
220832-US-1	US	10/15/2007	US11/872562	US7605466	10/20/2009	Sealed wafer packaging of microelectromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
220887-CN-3	CN	6/20/2007	CN200780053377A	CN101680676	5/28/2014	Micro-electromechanical system based switching in heating-ventilation-air-conditioning systems	Dolby Intellectual Property Licensing, LLC	Active
220887-DE-7	DE	6/20/2007	EP07798805A	EP2171363	8/12/2015	Micro-electromechanical system based switching in heating-ventilation-air-conditioning systems	Dolby Intellectual Property Licensing, LLC	Active
220887-JP-5	JP	6/20/2007	JP2010512139A	JP5255630	8/7/2013	Micro-electromechanical system based switching in heating, ventilation and air conditioning systems	Dolby Intellectual Property Licensing, LLC	Active
220887-KR-6	KR	6/20/2007	KR20097026184A	KR101450364	10/15/2014	Micro-electromechanical system based switching in heating-ventilation-air-conditioning systems	Dolby Intellectual Property Licensing, LLC	Active
220887-US-1	US	6/15/2007	US11/763631	US7612971	11/3/2009	Micro-electromechanical system based switching in heating-ventilation-air-conditioning systems	Dolby Intellectual Property Licensing, LLC	Active
221845-CN-3	CN	6/20/2007	CN200780053364A	CN101743606	5/8/2013	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
221845-DE-7	DE	6/20/2007	EP07798799A	EP2162897	2/27/2013	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
221845-JP-5	JP	6/20/2007	JP2010512136A	JP5124637	1/23/2013	Microelectromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
221845-US-1	US	6/15/2007	US11/763739	US8358488	1/22/2013	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
222176-US-1	US	10/14/2008	US12/250582	US8013548	9/6/2011	System, vehicle and related method	Dolby Intellectual Property Licensing, LLC	Active
222841-CN-4	CN	10/31/2008	CN200810191117A	CN101445513	1/8/2014	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
222841-DE-5	DE	10/31/2008	DE102008037499A	DE102008037499	3/22/2018	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
222841-JP-7	JP	10/31/2008	JP2008281374A	JP5535466	7/2/2014	Metal oxide coating	Dolby Intellectual Property Licensing, LLC	Active
222841-KR-8	KR	10/31/2008	KR20080107939A	KR101565613	11/3/2015	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
222841-TW-9	TW	10/31/2008	TW97142062A	TWI437004	5/11/2014	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active

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222841-US-10	US	7/30/2009	US12/512152	US8624050	1/7/2014	Solution process for transparent conductive oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
222841-US-2	US	10/31/2007	US11/931039	US7652157	1/26/2010	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
222841-US-3	US	10/31/2007	US11/930991	US8404877	3/26/2013	Metal oxide coatings	Dolby Intellectual Property Licensing, LLC	Active
223351-DE-4	DE	9/17/2010	DE102010037609A	DE102010037609	3/28/2019	System and method for operating a magnetic resonance coil	Dolby Intellectual Property Licensing, LLC	Active
223351-JP-3	JP	9/22/2010	JP2010211475A	JP5658517	1/28/2015	Device for driving a magnetic resonance coil	Dolby Intellectual Property Licensing, LLC	Active
223351-NL-5	NL	9/20/2010	NL2005375A	NL2005375	3/28/2011	System and method for magnetic resonance coil actuation.	Dolby Intellectual Property Licensing, LLC	Active
223351-US-1	US	9/23/2009	US12/565236	US8198895	6/12/2012	System and method for magnetic resonance coil actuation	Dolby Intellectual Property Licensing, LLC	Active
224610-CN-3	CN	6/20/2007	CN200780100111A	CN101772814	4/30/2014	Resettable mems micro-switch array based on current limiting apparatus	Dolby Intellectual Property Licensing, LLC	Active
224610-DE-7	DE	6/20/2007	EP07796290A	EP2162891	8/12/2015	Resettable mems micro-switch array based on current limiting apparatus	Dolby Intellectual Property Licensing, LLC	Active
224610-KR-6	KR	6/20/2007	KR20107001156A	KR101415456	7/4/2014	Resettable mems micro-switch array based on current limiting apparatus	Dolby Intellectual Property Licensing, LLC	Active
224610-US-1	US	6/19/2007	US11/764908	US8072723	12/6/2011	Resettable mems micro-switch array based on current limiting apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-CN-3	CN	6/20/2007	CN200780100251A	CN101874433	7/31/2013	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-DE-7	DE	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-FI-11	FI	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-FR-8	FR	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-GB-9	GB	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-IT-10	IT	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-JP-5	JP	6/20/2007	JP2010512132A	JP5364699	12/11/2013	Overcurrent protection device using a microelectromechanical system that can be operated remotely	Dolby Intellectual Property Licensing, LLC	Active
224631-SE-12	SE	6/20/2007	EP07835836A	EP2162964	3/21/2018	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
224631-US-1	US	6/15/2007	US11/763824	US7885043	2/8/2011	Remote-operable micro-electromechanical system based over-current protection apparatus	Dolby Intellectual Property Licensing, LLC	Active
225009-AU-17	AU	4/10/2008	AU2008247963A	AU2008247963	1/16/2014	Electric drive vehicle retrofit system and associated method	Dolby Intellectual Property Licensing, LLC	Active
225009-AU-25	AU	10/10/2014	AU2014246607A	AU2014246607	6/2/2016	Method of operating propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-AU-7	AU	4/10/2008	AU2008247961A	AU2008247961	3/6/2014	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-CN-13	CN	4/10/2008	CN200880023502A	CN101808845	8/13/2014	Method of operating propulsion system	Dolby Intellectual Property Licensing, LLC	Active

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225009-CN-18	CN	4/10/2008	CN200880023461A	CN101808844	11/6/2013	Electric drive vehicle retrofit system and the vehicle	Dolby Intellectual Property Licensing, LLC	Active
225009-CN-22	CN	4/10/2008	CN201210138641A	CN102673413	5/6/2015	Electric drive vehicle retrofit system and associated method	Dolby Intellectual Property Licensing, LLC	Active
225009-CN-23	CN	4/10/2008	CN201210419549A	CN102897044	10/28/2015	The method of operating propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-CN-24	CN	4/10/2008	CN201310273800A	CN103332121	2/24/2016	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-CN-8	CN	4/10/2008	CN200880023481A	CN102015354	5/28/2014	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-DE-30	DE	4/10/2008	EP08745446A	EP2146862	10/2/2019	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-DE-33	DE	4/10/2008	EP08745447A	EP2146863	6/23/2021	Method of operating a propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-EP-14	EP	4/10/2008	EP08745447A	EP2146863	6/23/2021	Method of operating a propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-EP-9	EP	4/10/2008	EP08745446A	EP2146862	10/2/2019	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-FR-29	FR	4/10/2008	EP08745446A	EP2146862	10/2/2019	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-FR-34	FR	4/10/2008	EP08745447A	EP2146863	6/23/2021	Method of operating a propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-GB-31	GB	4/10/2008	EP08745446A	EP2146862	10/2/2019	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-GB-35	GB	4/10/2008	EP08745447A	EP2146863	6/23/2021	Method of operating a propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-JP-10	JP	4/10/2008	JP2010507498A	JP5525441	6/18/2014	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-US-1	US	5/7/2007	US11/745179	US7723932	5/25/2010	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-US-2	US	5/7/2007	US11/745191	US9073448	7/7/2015	Method of operating propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-US-3	US	5/7/2007	US11/745180	US8001906	8/23/2011	Electric drive vehicle retrofit system and associated method	Dolby Intellectual Property Licensing, LLC	Active
225009-ZA-11	ZA	11/20/2009	ZA200908225A	ZA200908225	7/28/2010	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-ZA-16	ZA	11/20/2009	ZA200908226A	ZA200908226	7/28/2010	Method of operating propulsion system	Dolby Intellectual Property Licensing, LLC	Active
225009-ZA-21	ZA	11/20/2009	ZA200908227A	ZA200908227	7/28/2010	Electric drive vehicle retrofit system and associated method	Dolby Intellectual Property Licensing, LLC	Active
225017-US-1	US	9/17/2008	US12/211854	US8114382	2/14/2012	Myelin detection using benzofuran derivatives	Dolby Intellectual Property Licensing, LLC	Active
225160-US-1	US	12/18/2007	US11/958604	US7879963	2/1/2011	Composition, article, and associated method	Dolby Intellectual Property Licensing, LLC	Active
225349-US-1	US	10/7/2008	US12/246518	US8765275	7/1/2014	Energy storage device and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-AU-12	AU	1/29/2016	AU2016200572A	AU2016200572	12/8/2016	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active

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225533-CN-4	CN	7/14/2009	CN200980132797A	CN102124590	7/30/2014	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-DE-8	DE	7/14/2009	EP09790350A	EP2327118	4/22/2015	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-GB-9	GB	7/14/2009	EP09790350A	EP2327118	4/22/2015	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-IT-10	IT	7/14/2009	EP09790350A	EP2327118	4/22/2015	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-JP-6	JP	7/14/2009	JP2011523842A	JP5730201	6/3/2015	Seal rings and related methods	Dolby Intellectual Property Licensing, LLC	Active
225533-US-1	US	8/19/2008	US12/193796	US9166214	10/20/2015	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-US-11	US	9/3/2015	US14/844659	US9966578	5/8/2018	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225533-ZA-7	ZA	3/7/2011	ZA201101741A	ZA201101741	1/25/2012	Seal ring and associated method	Dolby Intellectual Property Licensing, LLC	Active
225698-DE-2	DE	11/27/2009	DE102009044684A	DE102009044684	6/10/2010	Apparatus for highly efficient operation of fuel cell systems and method for the production thereof	Dolby Intellectual Property Licensing, LLC	Active
225698-US-1	US	12/2/2008	US12/326171	US8486570	7/16/2013	Apparatus for high efficiency operation of fuel cell systems and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
225698-US-3	US	7/9/2013	US13/937643	US9148085	9/29/2015	Apparatus and method for high efficiency operation of fuel cell systems	Dolby Intellectual Property Licensing, LLC	Active
225698-US-4	US	9/28/2015	US14/867652	US10056630	8/21/2018	Apparatus and method for high efficiency operation of fuel cell systems	Dolby Intellectual Property Licensing, LLC	Active
225698-US-5	US	7/13/2018	US16/034817	US11075394	7/27/2021	Apparatus and method for high efficiency operation of fuel cell systems	Dolby Intellectual Property Licensing, LLC	Active
225698-US-6	US	6/18/2021	US17/351653	US11670788	6/6/2023	Apparatus and method for high efficiency operation of fuel cell systems	Dolby Intellectual Property Licensing, LLC	Active
226798-CN-2	CN	11/14/2008	CN200810176200A	CN101436048	1/13/2016	There is the programmable logic controller (plc) of the switching based on mems (micro electro mechanical system)	Dolby Intellectual Property Licensing, LLC	Active
226798-FR-8	FR	11/7/2008	EP08168549A	EP2065770	1/9/2013	Programmable logic controller having micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
226798-JP-4	JP	11/12/2008	JP2008289347A	JP5576604	8/20/2014	Programmable logic controller with switch using micro electromechanical system	Dolby Intellectual Property Licensing, LLC	Active
226798-KR-5	KR	11/13/2008	KR20080112580A	KR10151914 3	5/11/2015	' programmable logic controller having micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
226798-MX-6	MX	11/13/2008	MX2008014542A	MX2008014542	5/27/2009	Programmable logic controller having micro-electromechanical system based switching.	Dolby Intellectual Property Licensing, LLC	Active
226798-US-1	US	11/14/2007	US11/939729	US7839611	11/23/2010	Programmable logic controller having micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
226893-US-3	US	10/10/2008	US12/682302	US8662155	3/4/2014	Chip cooling device having wedge element	Dolby Intellectual Property Licensing, LLC	Active
227074-US-1	US	7/15/2008	US12/173549	US8644037	2/4/2014	Ac-ac converter with high frequency link	Dolby Intellectual Property Licensing, LLC	Active
227091-CN-3	CN	4/21/2009	CN200980000313A	CN101687710	12/17/2014	Composite article and related method	Dolby Intellectual Property Licensing, LLC	Active
227091-JP-5	JP	4/21/2009	JP2011510534A	JP5492195	5/14/2014	Composite product and manufacturing method	Dolby Intellectual Property Licensing, LLC	Active

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227091-US-1	US	5/19/2008	US12/122924	US7939050	5/10/2011	Composite article and related method	Dolby Intellectual Property Licensing, LLC	Active
227305-US-1	US	12/20/2007	US11/961532	US8159002	4/17/2012	Heterostructure device and associated method	Dolby Intellectual Property Licensing, LLC	Active
227305-US-2	US	3/13/2012	US13/418566	US8697506	4/15/2014	Heterostructure device and associated method	Dolby Intellectual Property Licensing, LLC	Active
227568-TW-3	TW	7/16/2008	TW97127051 A	TWI429731	3/11/2014	Red line emitting complex fluoride phosphors activated with mn4+	Dolby Intellectual Property Licensing, LLC	Active
227568-US-2	US	7/16/2008	US12/174236	US7847309	12/7/2010	Red line emitting complex fluoride phosphors activated with mn4+	Dolby Intellectual Property Licensing, LLC	Active
227731-CN-4	CN	11/14/2008	CN200880016 755A	CN101730956	10/30/2013	Energy storage device and method using ternary electrolyte	Dolby Intellectual Property Licensing, LLC	Active
227731-US-1	US	12/20/2007	US11/961024	US7993768	8/9/2011	Energy storage device and method	Dolby Intellectual Property Licensing, LLC	Active
227889-CN-2	CN	10/31/2008	CN200810175 980A	CN101436490	1/29/2014	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-DE-7	DE	10/24/2008	EP08167480A	EP2056315	7/23/2014	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-FR-8	FR	10/24/2008	EP08167480A	EP2056315	7/23/2014	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-GB-9	GB	10/24/2008	EP08167480A	EP2056315	7/23/2014	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-IT-10	IT	10/24/2008	EP08167480A	EP2056315	7/23/2014	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-JP-4	JP	10/30/2008	JP2008279202 A	JP5346551	11/20/2013	Switching based on micro electromechanical systems	Dolby Intellectual Property Licensing, LLC	Active
227889-KR-5	KR	10/30/2008	KR200801073 02A	KR10150392 9	3/18/2015	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
227889-MX-6	MX	10/30/2008	MX200801394 4A	MX2008013 944	5/26/2009	Micro-electromechanical system based switching.	Dolby Intellectual Property Licensing, LLC	Active
227889-US-1	US	11/1/2007	US11/933856	US7554222	6/30/2009	Micro-electromechanical system based switching	Dolby Intellectual Property Licensing, LLC	Active
228008-US-1	US	10/15/2008	US12/251665	US9960461	5/1/2018	System and method for temperature control of multi-battery systems	Dolby Intellectual Property Licensing, LLC	Active
228038-US-1	US	9/29/2008	US12/240200	US8217751	7/10/2012	Electronic device and method	Dolby Intellectual Property Licensing, LLC	Active
228073-US-1	US	11/5/2008	US12/265037	US8047317	11/1/2011	System, vehicle, and method	Dolby Intellectual Property Licensing, LLC	Active
228080-JP-2	JP	12/1/2009	JP2009273090 A	JP5639357	12/10/2014	System and method for a vehicle-based uninterruptible power supply	Dolby Intellectual Property Licensing, LLC	Active
228080-JP-3	JP	5/12/2014	JP2014098256 A	JP6050780	12/21/2016	Uninterruptible power supply system using vehicles	Dolby Intellectual Property Licensing, LLC	Active
228080-US-1	US	12/2/2008	US12/326189	US7960857	6/14/2011	System and method for vehicle based uninterruptable power supply	Dolby Intellectual Property Licensing, LLC	Active
228113-AU-2	AU	5/15/2009	AU200920194 0A	AU2009201 940	11/7/2013	High efficiency, multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-CN-3	CN	5/22/2009	CN200910145 253A	CN10159406 8	1/28/2015	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active

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228113-DE-5	DE	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-EP-4	EP	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-ES-6	ES	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-GB-7	GB	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-IT-8	IT	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-TR-9	TR	5/19/2009	EP09160660A	EP2128972	7/18/2018	High efficiency multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228113-US-1	US	5/27/2008	US12/154745	US7929325	4/19/2011	High efficiency, multi-source photovoltaic inverter	Dolby Intellectual Property Licensing, LLC	Active
228145-US-1	US	7/31/2008	US12/183326	US8229170	7/24/2012	Method and system for detecting a signal structure from a moving video platform	Dolby Intellectual Property Licensing, LLC	Active
228145-US-2	US	7/31/2008	US12/183334	US8233662	7/31/2012	Method and system for detecting signal color from a moving video platform	Dolby Intellectual Property Licensing, LLC	Active
228276-US-1	US	8/11/2008	US12/189221	US8049097	11/1/2011	Solar cell including cooling channels and method for fabrication	Dolby Intellectual Property Licensing, LLC	Active
228365-US-1	US	12/30/2008	US12/346378	US8194520	6/5/2012	Disc structure for bit-wise holographic storage	Dolby Intellectual Property Licensing, LLC	Active
228583-CH-11	CH	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-CN-2	CN	9/10/2009	CN200910176354A	CN101673945	1/28/2015	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-DE-6	DE	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-FI-12	FI	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-FR-7	FR	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-GB-8	GB	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-IT-9	IT	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-JP-3	JP	9/8/2009	JP2009206541A	JP5448660	3/19/2014	Electrical switching device	Dolby Intellectual Property Licensing, LLC	Active
228583-KR-4	KR	9/10/2009	KR20090085284A	KR101647142	8/9/2016	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-SE-10	SE	9/4/2009	EP09169531A	EP2164089	4/12/2017	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
228583-US-1	US	9/11/2008	US12/209064	US8687325	4/1/2014	Micro-electromechanical switch protection in series parallel topology	Dolby Intellectual Property Licensing, LLC	Active
229454-US-1	US	11/13/2008	US12/270247	US8034457	10/11/2011	Seal structure and associated method	Dolby Intellectual Property Licensing, LLC	Active
229947-US-1	US	4/1/2009	US12/416292	US8054147	11/8/2011	High voltage switch and method of making	Dolby Intellectual Property Licensing, LLC	Active

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229967-CN-3	CN	12/22/2009	CN200910215175A	CN101866780	6/8/2016	Micro electro-mechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-DE-8	DE	12/8/2009	EP09178257A	EP2200063	2/27/2019	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-EP-4	EP	12/8/2009	EP09178257A	EP2200063	2/27/2019	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-FR-7	FR	12/8/2009	EP09178257A	EP2200063	2/27/2019	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-GB-9	GB	12/8/2009	EP09178257A	EP2200063	2/27/2019	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-JP-5	JP	12/16/2009	JP2009284638A	JP5588663	9/10/2014	Micro electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-KR-6	KR	12/21/2009	KR20090127639A	KR101745722	6/9/2017	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229967-US-1	US	12/22/2008	US12/340775	US8093971	1/10/2012	Micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
229968-CA-2	CA	12/4/2008	CA2645820A	CA2645820	3/7/2017	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-CN-3	CN	12/22/2008	CN200810188423A	CN101465243	2/4/2015	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-DE-7	DE	12/11/2008	EP08171381A	EP2073237	10/19/2016	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-FR-8	FR	12/11/2008	EP08171381A	EP2073237	10/19/2016	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-GB-9	GB	12/11/2008	EP08171381A	EP2073237	10/19/2016	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-IT-10	IT	12/11/2008	EP08171381A	EP2073237	10/19/2016	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-JP-5	JP	12/12/2008	JP2008316857A	JP5530624	6/25/2014	Mems microswitch with dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-KR-6	KR	12/18/2008	KR20080129367A	KR101541915	8/4/2015	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229968-US-1	US	12/20/2007	US11/961737	US8610519	12/17/2013	Mems microswitch having a dual actuator and shared gate	Dolby Intellectual Property Licensing, LLC	Active
229972-US-1	US	10/3/2008	US12/245428	US8603659	12/10/2013	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
230506-US-1	US	11/13/2008	US12/270258	US8043986	10/25/2011	Sealing glass composition, method and article	Dolby Intellectual Property Licensing, LLC	Active
230521-US-3	US	1/23/2008	US12/519784	US9065133	6/23/2015	Cathode for an electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
230537-CN-3	CN	7/13/2010	CN201080049793A	CN102598348	11/25/2015	Battery pack arrangement and correlation technique	Dolby Intellectual Property Licensing, LLC	Active
230537-ZA-5	ZA	2/13/2012	ZA201201844A	ZA201201844	11/28/2012	Battery pack assembly and related processes	Dolby Intellectual Property Licensing, LLC	Active
230709-US-1	US	1/9/2009	US12/351131	US8334053	12/18/2012	Seal structure and associated method	Dolby Intellectual Property Licensing, LLC	Active
231192-CN-2	CN	8/26/2010	CN201010273552A	CN102005925	11/25/2015	There is the power supply of piezoelectric transformer and the method for power transfer	Dolby Intellectual Property Licensing, LLC	Active

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231192-JP-3	JP	8/27/2010	JP2010190196A	JP5749906	7/15/2015	Power supply with piezoelectric transformer and method of power conversion	Dolby Intellectual Property Licensing, LLC	Active
231192-US-1	US	8/28/2009	US12/550029	US8659921	2/25/2014	Power supply with a piezoelectric transformer and method for power conversion	Dolby Intellectual Property Licensing, LLC	Active
232246-DE-2	DE	10/8/2009	DE102009044211A	DE102009044211	3/21/2024	Energy management system for improving the efficiency of electric and hybrid powertrains	Dolby Intellectual Property Licensing, LLC	Active
232246-JP-3	JP	10/7/2009	JP2009232927A	JP5736110	6/17/2015	Propulsion system, method for assembling control system, and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232246-US-1	US	10/13/2008	US12/250182	US8120290	2/21/2012	Energy management system to improve efficiency of electric and hybrid drive trains	Dolby Intellectual Property Licensing, LLC	Active
232258-CN-3	CN	4/26/2012	CN201210138329A	CN102856100	9/14/2016	There are the switch arrays of the circuit of the annual distribution adjusting the gating signal being applied to switch arrays	Dolby Intellectual Property Licensing, LLC	Active
232258-US-1	US	5/29/2009	US12/474299	US8427792	4/23/2013	Method and system to enhance reliability of switch array	Dolby Intellectual Property Licensing, LLC	Active
232258-US-2	US	4/28/2011	US13/096071	US8582254	11/12/2013	Switching array having circuitry to adjust a temporal distribution of a gating signal applied to the array	Dolby Intellectual Property Licensing, LLC	Active
232260-US-1	US	4/30/2009	US12/433107	US8435673	5/7/2013	Cathode composition with phosphorus composition additive and electrochemical cell comprising same	Dolby Intellectual Property Licensing, LLC	Active
232492-US-1	US	4/4/2011	US13/066000	US9007689	4/14/2015	Method and apparatus for forming multiple images	Dolby Intellectual Property Licensing, LLC	Active
232652-AU-10	AU	4/16/2014	AU2014202139A	AU2014202139	2/11/2016	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-AU-3	AU	7/2/2009	AU2009274296A	AU2009274296	1/16/2014	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-CN-4	CN	7/2/2009	CN200980138134A	CN102164772	6/3/2015	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-DE-12	DE	7/2/2009	EP09790050A	EP2307227	10/9/2019	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-EP-5	EP	7/2/2009	EP09790050A	EP2307227	10/9/2019	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-JP-9	JP	1/24/2013	JP2013010706A	JP5675858	2/25/2015	Method and system for controlling an energy storage device for a vehicle	Dolby Intellectual Property Licensing, LLC	Active
232652-US-1	US	7/24/2008	US12/179188	US8212532	7/3/2012	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-US-8	US	7/3/2012	US13/541549	US8587260	11/19/2013	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232652-ZA-7	ZA	2/9/2011	ZA201101056A	ZA201101056	10/26/2011	Method and system for control of a vehicle energy storage device	Dolby Intellectual Property Licensing, LLC	Active
232737-CN-2	CN	12/1/2009	CN200910253369A	CN101746247	1/6/2016	Auxiliary drive apparatus and manufacture method thereof	Dolby Intellectual Property Licensing, LLC	Active
232737-DE-10	DE	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-EP-3	EP	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-ES-12	ES	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-FR-9	FR	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active

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232737-GB-13	GB	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-IT-11	IT	11/20/2009	EP09176593A	EP2193954	10/21/2020	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-JP-7	JP	10/7/2013	JP2013209761A	JP5844787	1/20/2016	Auxiliary drive device and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
232737-KR-5	KR	12/1/2009	KR20090117742A	KR101614948	4/22/2016	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-US-1	US	12/2/2008	US12/326152	US8274173	9/25/2012	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232737-US-6	US	8/7/2012	US13/568251	US9061595	6/23/2015	Auxiliary drive apparatus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
232802-CN-2	CN	1/29/2010	CN201010114878A	CN101817342	3/26/2014	Modular auxiliary power unit assembly for an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
232802-US-1	US	1/29/2009	US12/362218	US8376070	2/19/2013	Modular auxiliary power unit assembly for an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
232802-US-5	US	2/15/2013	US13/767962	US8695739	4/15/2014	Modular auxiliary power unit assembly for an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
233177-US-1	US	9/18/2008	US12/284132	US7994418	8/9/2011	Monolithically connected photovoltaic devices on flexible substrates	Dolby Intellectual Property Licensing, LLC	Active
233585-US-1	US	12/12/2008	US12/334019	US8199681	6/12/2012	Software radio frequency canceller	Dolby Intellectual Property Licensing, LLC	Active
233619-DE-4	DE	3/23/2010	EP10157266A	EP2236370	5/16/2018	Apparatus and method for advanced anti-skid brake and traction controls	Dolby Intellectual Property Licensing, LLC	Active
233619-FR-5	FR	3/23/2010	EP10157266A	EP2236370	5/16/2018	Apparatus and method for advanced anti-skid brake and traction controls	Dolby Intellectual Property Licensing, LLC	Active
233619-GB-6	GB	3/23/2010	EP10157266A	EP2236370	5/16/2018	Apparatus and method for advanced anti-skid brake and traction controls	Dolby Intellectual Property Licensing, LLC	Active
233619-JP-3	JP	3/24/2010	JP2010067176A	JP5651357	1/14/2015	Disc brake system	Dolby Intellectual Property Licensing, LLC	Active
233619-US-1	US	3/30/2009	US12/413856	US9796364	10/24/2017	Apparatus and method for advanced anti-skid brake and traction controls	Dolby Intellectual Property Licensing, LLC	Active
233633-US-1	US	2/25/2009	US12/392609	US8688046	4/1/2014	Quiet spectrum harvester	Dolby Intellectual Property Licensing, LLC	Active
233635-AU-5	AU	6/3/2010	AU2010256533A	AU2010256533	12/15/2011	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-CA-6	CA	6/3/2010	CA2764366A	CA2764366	12/4/2018	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-CN-7	CN	6/3/2010	CN201080025128A	CN102802672	12/16/2015	The imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-DE-10	DE	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-DK-11	DK	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-FI-12	FI	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-FR-13	FR	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active

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233635-GB-14	GB	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-JP-9	JP	6/3/2010	JP20125141244	JP5897461	3/30/2016	Imaging myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-NL-15	NL	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-NO-16	NO	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-SE-17	SE	6/3/2010	EP10728034A	EP2437792	10/21/2015	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-US-1	US	6/4/2009	US12/478300	US8617515	12/31/2013	Imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233635-US-4	US	2/21/2011	US13/031349	US8658129	2/25/2014	Agents and methods for the imaging of myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
233705-US-1	US	12/16/2008	US12/336009	US9130747	9/8/2015	Software radio frequency canceller	Dolby Intellectual Property Licensing, LLC	Active
233920-US-1	US	4/3/2009	US12/418039	US7973424	7/5/2011	Method and apparatus for producing tractive effort with interface to other apparatus	Dolby Intellectual Property Licensing, LLC	Active
234194-US-1	US	8/19/2009	US12/543785	US7885011	2/8/2011	Objective for optical imaging systems	Dolby Intellectual Property Licensing, LLC	Active
234194-US-2	US	6/23/2010	US12/821731	US8169696	5/1/2012	Systems for intraoperative nerve imaging	Dolby Intellectual Property Licensing, LLC	Active
234201-CN-2	CN	3/11/2010	CN201010144018A	CN101837775	1/6/2016	For the system and method that optinization energy reservoir part uses	Dolby Intellectual Property Licensing, LLC	Active
234201-DE-6	DE	3/8/2010	EP10155723A	EP2228275	7/4/2018	Vehicle with optimizing of the energy storage component usage	Dolby Intellectual Property Licensing, LLC	Active
234201-EP-3	EP	3/8/2010	EP10155723A	EP2228275	7/4/2018	Vehicle with optimizing of the energy storage component usage	Dolby Intellectual Property Licensing, LLC	Active
234201-FR-8	FR	3/8/2010	EP10155723A	EP2228275	7/4/2018	Vehicle with optimizing of the energy storage component usage	Dolby Intellectual Property Licensing, LLC	Active
234201-GB-7	GB	3/8/2010	EP10155723A	EP2228275	7/4/2018	Vehicle with optimizing of the energy storage component usage	Dolby Intellectual Property Licensing, LLC	Active
234201-IN-4	IN	2/25/2010	IN422DE2010A	IN339416	7/3/2020	Vehicle with optimized energy storage component	Dolby Intellectual Property Licensing, LLC	Active
234201-JP-5	JP	3/9/2010	JP20100512254	JP5736115	6/17/2015	Vehicles that optimize the use of energy storage components	Dolby Intellectual Property Licensing, LLC	Active
234201-US-1	US	3/11/2009	US12/401726	US8024082	9/20/2011	System and method for optimizing energy storage component usage	Dolby Intellectual Property Licensing, LLC	Active
234321-US-1	US	5/1/2009	US12/433992	US8154149	4/10/2012	Method and apparatus for charging a vehicle energy storage system	Dolby Intellectual Property Licensing, LLC	Active
234422-CN-2	CN	8/13/2010	CN201010258366A	CN102176391	8/21/2013	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
234422-KR-5	KR	8/13/2010	KR20100078421A	KR101766482	8/8/2017	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
234422-US-1	US	8/14/2009	US12/541321	US7928333	4/19/2011	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
234574-US-1	US	3/30/2009	US12/414234	US7961572	6/14/2011	System and method for reading micro-holograms with reduced error rates	Dolby Intellectual Property Licensing, LLC	Active

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234577-DE-2	DE	2/9/2010	DE102010000347A	DE102010000347	8/19/2010	Electrically driven power take-off system and method for its production	Dolby Intellectual Property Licensing, LLC	Active
234577-US-1	US	2/18/2009	US12/372880	US8115334	2/14/2012	Electrically driven power take-off system and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
234828-US-1	US	2/16/2009	US12/371675	US8118237	2/21/2012	System and method for vehicle temperature control	Dolby Intellectual Property Licensing, LLC	Active
234863-US-1	US	3/30/2009	US12/414284	US8327247	12/4/2012	Bit probability estimation method for noisy modulation code	Dolby Intellectual Property Licensing, LLC	Active
234866-US-1	US	3/30/2009	US12/414310	US7916605	3/29/2011	Joint dc minimization and bit detection	Dolby Intellectual Property Licensing, LLC	Active
234874-US-1	US	3/30/2009	US12/414263	US9318145	4/19/2016	Method for decoding under optical and electronic noise	Dolby Intellectual Property Licensing, LLC	Active
234996-US-1	US	2/25/2009	US12/392751	US9563889	2/7/2017	Method and apparatus for secure wireless point of sale transactions	Dolby Intellectual Property Licensing, LLC	Active
235033-DE-7	DE	3/26/2010	EP10158010A	EP2236344	11/10/2021	System for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-EP-2	EP	3/26/2010	EP10158010A	EP2236344	11/10/2021	System for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-EP-5	EP	3/26/2010	EP21205291A	EP4009512	6/8/2022	Apparatus, method, and system for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-FR-6	FR	3/26/2010	EP10158010A	EP2236344	11/10/2021	System for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-GB-8	GB	3/26/2010	EP10158010A	EP2236344	11/10/2021	System for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-JP-3	JP	3/30/2010	JP2010076542A	JP5809392	11/10/2015	Apparatus, method and system for transporting electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-US-1	US	4/3/2009	US12/417983	US7928598	4/19/2011	Apparatus, method, and system for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235033-US-4	US	3/29/2011	US13/074323	US8154151	4/10/2012	Apparatus, method, and system for conveying electrical energy	Dolby Intellectual Property Licensing, LLC	Active
235141-CN-3	CN	3/17/2010	CN201010157228A	CN101837722	12/2/2015	For system and the manufacture method thereof of vehicle propulsion	Dolby Intellectual Property Licensing, LLC	Active
235141-JP-6	JP	3/10/2010	JP2010052445A	JP6247808	12/13/2017	System for propulsion of vehicle having cvt and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
235141-US-2	US	3/17/2009	US12/405874	US8535200	9/17/2013	Vehicle propulsion system having a continuously variable transmission and method of making same	Dolby Intellectual Property Licensing, LLC	Active
235150-BR-2	BR	10/19/2009	BRPI0904082A	BRPI0904082	5/28/2019	Engine drive circuit	Dolby Intellectual Property Licensing, LLC	Active
235150-CA-17	CA	10/15/2009	CA3005188A	CA3005188	6/30/2020	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-CA-18	CA	10/15/2009	CA3056633A	CA3056633	4/13/2021	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-CA-19	CA	10/15/2009	CA3056637A	CA3056637	9/27/2022	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-CA-3	CA	10/15/2009	CA2682843A	CA2682843	4/30/2019	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-CN-4	CN	10/22/2009	CN200910209318A	CN101729020	12/24/2014	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active

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235150-EP-22	EP	10/14/2009	EP19199167A	EP3641097	4/22/2020	Electric vehicle charging system	Dolby Intellectual Property Licensing, LLC	Active
235150-IN-6	IN	10/7/2009	IN2082DE2009A	IN329900	1/24/2020	Apparatus for energy transfer using converter and method	Dolby Intellectual Property Licensing, LLC	Active
235150-JP-7	JP	10/20/2009	JP2009240958A	JP5674301	2/25/2015	Device for energy transfer using a transducer and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
235150-KR-13	KR	9/1/2016	KR20160112685A	KR101733931	5/8/2017	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-KR-8	KR	10/22/2009	KR20090100663A	KR101655411	9/7/2016	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-1	US	10/22/2008	US12/256466	US8080973	12/20/2011	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-10	US	2/27/2012	US13/406208	US9024573	5/5/2015	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-11	US	2/27/2012	US13/406241	US10131234	11/20/2018	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-12	US	1/15/2015	US14/597852	US9321367	4/26/2016	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-14	US	11/4/2016	US15/343493	US9809121	11/7/2017	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-15	US	9/7/2017	US15/697948	US9975439	5/22/2018	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-16	US	4/4/2018	US15/945168	US10604023	3/31/2020	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-23	US	2/11/2020	US16/787185	US10994623	5/4/2021	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-24	US	4/5/2021	US17/222270	US11752887	9/12/2023	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235150-US-9	US	12/8/2011	US13/314572	US9227523	1/5/2016	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235152-DE-2	DE	10/16/2009	DE102009044281A	DE102009044281	4/29/2010	Device for transmitting energy by means of power electronics and machine inductance, and method for producing the same	Dolby Intellectual Property Licensing, LLC	Active
235152-JP-3	JP	10/20/2009	JP2009240959A	JP5813283	11/17/2015	Vehicle having power electronic device and device for transmitting energy using mechanical inductance	Dolby Intellectual Property Licensing, LLC	Active
235152-KR-4	KR	10/22/2009	KR20090100614A	KR101652379	8/30/2016	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235152-KR-9	KR	8/7/2017	KR20170099594A	KR101829173	2/13/2018	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235152-US-1	US	10/22/2008	US12/256457	US7932633	4/26/2011	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235152-US-5	US	3/25/2011	US13/072085	US8653696	2/18/2014	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active

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235152-US-6	US	1/31/2014	US14/169338	US9620974	4/11/2017	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235152-US-8	US	11/15/2016	US15/351608	US11167654	11/9/2021	Apparatus for transferring energy using power electronics and machine inductance and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
235526-AU-2	AU	11/12/2010	AU2010241429A	AU2010241429	6/2/2011	Systems and apparatus relating to solar-thermal power generation	Dolby Intellectual Property Licensing, LLC	Active
235526-CN-3	CN	11/16/2010	CN201010564304A	CN102062066	11/26/2014	Apparatus relating to solar-thermal power generation	Dolby Intellectual Property Licensing, LLC	Active
235526-DE-5	DE	11/5/2010	EP10190274A	EP2322796	9/26/2018	Systems and apparatus relating to solar-thermal power generation	Dolby Intellectual Property Licensing, LLC	Active
235526-EP-4	EP	11/5/2010	EP10190274A	EP2322796	9/26/2018	Systems and apparatus relating to solar-thermal power generation	Dolby Intellectual Property Licensing, LLC	Active
235526-US-1	US	11/16/2009	US12/619199	US8276379	10/2/2012	Systems and apparatus relating to solar-thermal power generation	Dolby Intellectual Property Licensing, LLC	Active
235655-CH-3	CH	9/22/2010	EP10178461A	EP2306580	5/20/2015	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235655-DE-4	DE	9/22/2010	EP10178461A	EP2306580	5/20/2015	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235655-GB-5	GB	9/22/2010	EP10178461A	EP2306580	5/20/2015	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235655-IT-6	IT	9/22/2010	EP10178461A	EP2306580	5/20/2015	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235655-US-1	US	9/24/2009	US12/565842	US8178231	5/15/2012	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235714-US-1	US	11/4/2009	US12/611993	US8343661	1/1/2013	Cathode compositions comprising zn and chalcogenide and energy storage cell comprising same	Dolby Intellectual Property Licensing, LLC	Active
235738-US-1	US	9/29/2010	US12/893661	US8329336	12/11/2012	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
235783-AU-8	AU	5/28/2015	AU2015202902A	AU2015202902	9/8/2016	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235783-CN-3	CN	7/23/2010	CN201010245418A	CN102031045	2/18/2015	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235783-DE-5	DE	7/20/2010	EP10170065A	EP2302006	11/28/2012	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235783-ES-6	ES	7/20/2010	EP10170065A	EP2302006	11/28/2012	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235783-IT-7	IT	7/20/2010	EP10170065A	EP2302006	11/28/2012	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235783-US-1	US	9/25/2009	US12/566962	US8216357	7/10/2012	Protective coating compositions and devices	Dolby Intellectual Property Licensing, LLC	Active
235849-AU-2	AU	12/2/2010	AU2010249139A	AU2010249139	11/5/2015	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235849-BR-3	BR	11/30/2010	BRPI1004671A	BRPI1004671	11/5/2019	Current control device and service meter	Dolby Intellectual Property Licensing, LLC	Active
235849-CA-4	CA	11/26/2010	CA2722635A	CA2722635	6/5/2018	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active

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235849-DE-9	DE	11/30/2010	EP10193206A	EP2330384	3/27/2019	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235849-EP-5	EP	11/30/2010	EP10193206A	EP2330384	3/27/2019	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235849-FR-8	FR	11/30/2010	EP10193206A	EP2330384	3/27/2019	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235849-GB-10	GB	11/30/2010	EP10193206A	EP2330384	3/27/2019	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235849-JP-6	JP	12/1/2010	JP2010268225A	JP5809797	11/11/2015	Method and apparatus for switching power	Dolby Intellectual Property Licensing, LLC	Active
235849-NZ-7	NZ	12/2/2010	NZ589662 10A	NZ589662	11/30/2012	Current control device including a mems switch coupled between line and load sockets	Dolby Intellectual Property Licensing, LLC	Active
235849-US-1	US	12/2/2009	US12/629309	US8916995	12/23/2014	Method and apparatus for switching electrical power	Dolby Intellectual Property Licensing, LLC	Active
235896-US-1	US	4/30/2010	US12/771907	US8248755	8/21/2012	Polyimides and thin films, electronic articles and capacitors comprising these, and methods of making them	Dolby Intellectual Property Licensing, LLC	Active
236086-US-1	US	12/18/2009	US12/642501	US8753711	6/17/2014	Edge sealing method using barrier coatings	Dolby Intellectual Property Licensing, LLC	Active
236088-US-1	US	10/12/2009	US12/577629	US9472783	10/18/2016	Barrier coating with reduced process time	Dolby Intellectual Property Licensing, LLC	Active
236159-US-1	US	2/24/2010	US12/711556	US8652689	2/18/2014	Energy storage device and system	Dolby Intellectual Property Licensing, LLC	Active
236639-US-1	US	8/31/2009	US12/551410	US8124299	2/28/2012	Methods for using optical data storage media	Dolby Intellectual Property Licensing, LLC	Active
236639-US-7	US	2/27/2012	US13/405681	US8703388	4/22/2014	Optical data storage media	Dolby Intellectual Property Licensing, LLC	Active
236909-CN-2	CN	7/9/2010	CN201010231262A	CN101958651	6/19/2013	Transformer on-load tap changer using mems technology	Dolby Intellectual Property Licensing, LLC	Active
236909-JP-4	JP	7/7/2010	JP2010154403A	JP5237994	7/17/2013	Transformer tap changer using mems technology	Dolby Intellectual Property Licensing, LLC	Active
236909-US-1	US	7/9/2009	US12/500212	US8203319	6/19/2012	Transformer on-load tap changer using mems technology	Dolby Intellectual Property Licensing, LLC	Active
236987-US-1	US	3/24/2010	US12/730496	US9368774	6/14/2016	Electrolyte separator and method of making the electrolyte separator	Dolby Intellectual Property Licensing, LLC	Active
237446-US-2	US	1/27/2010	US12/694840	US8406487	3/26/2013	Method and system for contactless fingerprint detection and verification	Dolby Intellectual Property Licensing, LLC	Active
237714-CN-3	CN	3/31/2011	CN201110093474A	CN102208816	8/19/2015	Control distribution transformer and manufacture method thereof	Dolby Intellectual Property Licensing, LLC	Active
237714-DE-9	DE	3/28/2011	EP11160074A	EP2434614	6/19/2013	Distribution transformer transmitting control signals and method of making same	Dolby Intellectual Property Licensing, LLC	Active
237714-FR-10	FR	3/28/2011	EP11160074A	EP2434614	6/19/2013	Distribution transformer transmitting control signals and method of making same	Dolby Intellectual Property Licensing, LLC	Active
237714-IN-5	IN	3/15/2011	IN722DE2011A	IN341301	7/17/2020	Control distribution transformer and method making same	Dolby Intellectual Property Licensing, LLC	Active
237714-JP-6	JP	3/24/2011	JP2011065109A	JP5735828	6/17/2015	System with distribution transformer including communication module	Dolby Intellectual Property Licensing, LLC	Active
237714-US-1	US	3/31/2010	US12/751098	US8102148	1/24/2012	Augmented distribution transformer and method of making same	Dolby Intellectual Property Licensing, LLC	Active

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237714-US-2	US	3/31/2010	US12/751151	US8340833	12/25/2012	Control distribution transformer and method of making same	Dolby Intellectual Property Licensing, LLC	Active
237714-US-7	US	11/28/2011	US13/304989	US8423196	4/16/2013	Augmented distribution transformer and method of making same	Dolby Intellectual Property Licensing, LLC	Active
237714-US-8	US	12/21/2012	US13/723726	US9263182	2/16/2016	Control distribution transformer and method of making same	Dolby Intellectual Property Licensing, LLC	Active
237735-US-1	US	8/28/2009	US12/549839	US8766642	7/1/2014	Electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
237851-CN-2	CN	3/31/2011	CN201110093490.A	CN102205844	8/17/2016	Equipment and manufacture method thereof for combination drive direct torque	Dolby Intellectual Property Licensing, LLC	Active
237851-DE-6	DE	3/28/2011	EP11160077.A	EP2371646	11/29/2017	Apparatus for hybrid drive torque control	Dolby Intellectual Property Licensing, LLC	Active
237851-ES-10	ES	3/28/2011	EP11160077A	EP2371646	11/29/2017	Apparatus for hybrid drive torque control	Dolby Intellectual Property Licensing, LLC	Active
237851-FR-7	FR	3/28/2011	EP11160077A	EP2371646	11/29/2017	Apparatus for hybrid drive torque control	Dolby Intellectual Property Licensing, LLC	Active
237851-GB-8	GB	3/28/2011	EP11160077A	EP2371646	11/29/2017	Apparatus for hybrid drive torque control	Dolby Intellectual Property Licensing, LLC	Active
237851-IN-4	IN	3/15/2011	IN723DE2011A	IN388101	2/4/2022	Apparatus for hybrid drive torque control and method of	Dolby Intellectual Property Licensing, LLC	Active
237851-IT-9	IT	3/28/2011	EP11160077A	EP2371646	11/29/2017	Apparatus for hybrid drive torque control	Dolby Intellectual Property Licensing, LLC	Active
237851-JP-5	JP	3/24/2011	JP2011065108A	JP6389025	9/12/2018	Device for torque control of hybrid drive	Dolby Intellectual Property Licensing, LLC	Active
237851-US-1	US	3/31/2010	US12/751612	US9145048	9/29/2015	Apparatus for hybrid engine control and method of manufacture same	Dolby Intellectual Property Licensing, LLC	Active
237934-DE-5	DE	8/3/2010	EP10171761A	EP2287915	1/9/2013	Fused wiring harness for a photovoltaic system	Dolby Intellectual Property Licensing, LLC	Active
237934-ES-6	ES	8/3/2010	EP10171761A	EP2287915	1/9/2013	Fused wiring harness for a photovoltaic system	Dolby Intellectual Property Licensing, LLC	Active
237934-IT-7	IT	8/3/2010	EP10171761A	EP2287915	1/9/2013	Fused wiring harness for a photovoltaic system	Dolby Intellectual Property Licensing, LLC	Active
237954-CN-2	CN	2/25/2011	CN201110051953A	CN102189994	9/7/2016	For the electronic and system and method for motor vehicle driven by mixed power operation	Dolby Intellectual Property Licensing, LLC	Active
237954-DE-7	DE	1/25/2011	EP11152128A	EP2368751	6/14/2023	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
237954-EP-3	EP	1/25/2011	EP11152128A	EP2368751	6/14/2023	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
237954-FR-6	FR	1/25/2011	EP11152128A	EP2368751	6/14/2023	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
237954-GB-8	GB	1/25/2011	EP11152128A	EP2368751	6/14/2023	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
237954-IN-4	IN	1/25/2011	IN180DE2011A	IN414523	12/16/2022	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active
237954-JP-5	JP	1/25/2011	JP2011012494A	JP5859732	2/16/2016	Electric vehicle or hybrid vehicle operating system	Dolby Intellectual Property Licensing, LLC	Active
237954-US-1	US	3/9/2010	US12/719921	US8086364	12/27/2011	System and method for operation of electric and hybrid vehicles	Dolby Intellectual Property Licensing, LLC	Active

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238115-CN-2	CN	1/13/2011	CN201110025105A	CN102131262	11/25/2015	Intelligence heterogeneous wireless switches	Dolby Intellectual Property Licensing, LLC	Active
238115-DE-8	DE	12/17/2010	EP10195582A	EP2346283	2/27/2019	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-EP-3	EP	12/17/2010	EP10195582A	EP2346283	2/27/2019	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-FR-7	FR	12/17/2010	EP10195582A	EP2346283	2/27/2019	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-GB-9	GB	12/17/2010	EP10195582A	EP2346283	2/27/2019	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-KR-4	KR	1/14/2011	KR20110004110A	KR101734556	5/11/2017	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-US-1	US	1/14/2010	US12/687673	US9473999	10/18/2016	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-US-5	US	9/27/2016	US15/277630	US10064114	8/28/2018	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238115-US-6	US	8/6/2018	US16/056007	US10750420	8/18/2020	Intelligent heterogeneous wireless handoff	Dolby Intellectual Property Licensing, LLC	Active
238312-BR-3	BR	4/25/2011	BRPI1102023A	BRPI1102023	1/7/2020	Power transfer systems	Dolby Intellectual Property Licensing, LLC	Active
238312-BR-9	BR	4/26/2011	BRPI1101998A	BRPI1101998	12/17/2019	Energy transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-CN-10	CN	5/12/2011	CN201110134191A	CN102340185	5/20/2015	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-CN-4	CN	5/12/2011	CN201110134150A	CN102244417	6/17/2015	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-DE-20	DE	5/6/2011	EP11165079A	EP2392553	8/24/2016	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-DE-22	DE	5/6/2011	EP11165080A	EP2386531	11/9/2016	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-DE-25	DE	5/6/2011	EP16179677A	EP3116002	7/3/2019	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-EP-19	EP	5/6/2011	EP16179677A	EP3116002	7/3/2019	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-FR-21	FR	5/6/2011	EP11165079A	EP2392553	8/24/2016	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-FR-23	FR	5/6/2011	EP11165080A	EP2386531	11/9/2016	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-FR-24	FR	5/6/2011	EP16179677A	EP3116002	7/3/2019	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-IN-12	IN	4/28/2011	IN1254DE2011A	IN298303	7/6/2018	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-IN-6	IN	4/27/2011	IN1246DE2011A	IN412645	12/2/2022	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-JP-13	JP	5/9/2011	JP2011103929A	JP5813364	11/17/2015	Dielectric materials for power transmission systems	Dolby Intellectual Property Licensing, LLC	Active
238312-JP-7	JP	5/9/2011	JP2011103950A	JP5802050	10/28/2015	Dielectric materials for power transmission systems	Dolby Intellectual Property Licensing, LLC	Active

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238312-SG-14	SG	5/12/2011	SG201103420 4A	SG176378	12/29/2011	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-SG-17	SG	11/5/2013	201308204-5	N/A	5/9/2017		Dolby Intellectual Property Licensing, LLC	Active
238312-SG-18	SG	11/4/2013	201308177-3	N/A	6/14/2017		Dolby Intellectual Property Licensing, LLC	Active
238312-US-1	US	5/12/2010	US12/778166	US9174876	11/3/2015	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238312-US-15	US	3/30/2011	US13/075911	US8968603	3/3/2015	Dielectric materials	Dolby Intellectual Property Licensing, LLC	Active
238312-US-16	US	3/30/2011	US13/075997	US8586495	11/19/2013	Dielectric materials	Dolby Intellectual Property Licensing, LLC	Active
238312-US-2	US	5/12/2010	US12/778189	US8968609	3/3/2015	Dielectric materials for power transfer system	Dolby Intellectual Property Licensing, LLC	Active
238320-US-1	US	3/19/2010	US12/727536	US8779726	7/15/2014	Control system and method for charging sealed batteries	Dolby Intellectual Property Licensing, LLC	Active
238346-CN-2	CN	8/17/2010	CN201010262 686A	CN1019954 3	3/12/2014	Apparatus and method for bearing condition monitoring	Dolby Intellectual Property Licensing, LLC	Active
238346-JP-4	JP	8/13/2010	JP2010181183 A	JP5693083	4/1/2015	Bearing state monitoring apparatus and method	Dolby Intellectual Property Licensing, LLC	Active
238346-US-1	US	8/17/2009	US12/542046	US8229682	7/24/2012	Apparatus and method for bearing condition monitoring	Dolby Intellectual Property Licensing, LLC	Active
238407-US-1	US	8/31/2009	US12/550521	US8182967	5/22/2012	Optical data storage media and methods for using the same	Dolby Intellectual Property Licensing, LLC	Active
238407-US-7	US	12/14/2010	US12/967409	US8178261	5/15/2012	Optical data storage media and methods for using the same	Dolby Intellectual Property Licensing, LLC	Active
238413-CN-2	CN	2/1/2011	CN201110062 345A	CN1021589 17	6/8/2016	Switching between different vocoder systems	Dolby Intellectual Property Licensing, LLC	Active
238413-KR-4	KR	2/1/2011	KR201100099 98A	KR1012563 16	4/18/2013	Handoffs between different voice encoder systems	Dolby Intellectual Property Licensing, LLC	Active
238413-US-1	US	2/3/2010	US12/699699	US8521520	8/27/2013	Handoffs between different voice encoder systems	Dolby Intellectual Property Licensing, LLC	Active
238414-CN-2	CN	3/10/2011	CN201110064 382A	CN1021958 06	8/17/2016	Switching for many transmission technologys is measured	Dolby Intellectual Property Licensing, LLC	Active
238414-KR-4	KR	3/10/2011	KR201100215 49A	KR1017877 54	10/18/2017	Handoff metric for multiple transmission technologies	Dolby Intellectual Property Licensing, LLC	Active
238414-US-1	US	3/10/2010	US12/721359	US8315630	11/20/2012	Handoff metric for multiple transmission technologies	Dolby Intellectual Property Licensing, LLC	Active
238414-US-5	US	11/5/2012	US13/669253	US8688124	4/1/2014	Handoff metric for multiple transmission technologies	Dolby Intellectual Property Licensing, LLC	Active
238668-CN-2	CN	7/21/2011	CN201110280 532A	CN1023773 3	5/13/2015	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active
238668-DE-8	DE	7/13/2011	EP11173778A	EP2416479	5/1/2019	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active
238668-EP-3	EP	7/13/2011	EP11173778A	EP2416479	5/1/2019	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active
238668-IN-4	IN	7/14/2011	IN1975DE201 1A	IN332567	2/28/2020	Apparatus for power conversion in a power electronic system	Dolby Intellectual Property Licensing, LLC	Active
238668-JP-5	JP	7/13/2011	JP2011154366 A	JP6088126	3/1/2017	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active

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238668-US-1	US	7/21/2010	US12/840423	US8310083	11/13/2012	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active
238668-US-6	US	11/5/2012	US13/668660	US8541904	9/24/2013	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active
238727-US-1	US	12/15/2009	US12/637797	US8377593	2/19/2013	Energy storage device	Dolby Intellectual Property Licensing, LLC	Active
238727-US-3	US	9/14/2012	US13/617232	US8530090	9/10/2013	Energy storage device	Dolby Intellectual Property Licensing, LLC	Active
238780-CN-2	CN	12/21/2011	CN201110463346A	CN102623221	12/7/2016	Compositions and manufacture method	Dolby Intellectual Property Licensing, LLC	Active
238780-DE-6	DE	12/14/2011	EP11193469A	EP2468928	1/26/2022	Manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
238780-EP-3	EP	12/14/2011	EP11193469A	EP2468928	1/26/2022	Manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
238780-JP-4	JP	12/16/2011	JP2011275135A	JP5872278	3/1/2016	Method of forming a microelectromechanical system device	Dolby Intellectual Property Licensing, LLC	Active
238780-KR-5	KR	12/20/2011	KR20110138516A	KR101983854	5/29/2019	Method of forming a micro-electromechanical system device	Dolby Intellectual Property Licensing, LLC	Active
238780-US-1	US	12/21/2010	US12/975090	US8826529	9/9/2014	Method of forming a micro-electromechanical system device	Dolby Intellectual Property Licensing, LLC	Active
238789-CN-2	CN	11/30/2010	CN201010586673A	CN102082043	9/23/2015	Construction of switch	Dolby Intellectual Property Licensing, LLC	Active
238789-DE-6	DE	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-FI-8	FI	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-FR-7	FR	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-GB-9	GB	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-IT-10	IT	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-JP-4	JP	11/10/2010	JP2010251379A	JP5829804	12/9/2015	Switch structure	Dolby Intellectual Property Licensing, LLC	Active
238789-KR-5	KR	11/29/2010	KR20100119651A	KR101745725	6/9/2017	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-SE-11	SE	11/19/2010	EP10191932A	EP2328160	2/28/2018	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238789-US-1	US	11/30/2009	US12/627476	US8779886	7/15/2014	Switch structures	Dolby Intellectual Property Licensing, LLC	Active
238794-CN-2	CN	9/21/2010	CN201010500702A	CN102034648	6/25/2014	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active
238794-DE-6	DE	9/17/2010	EP10177345A	EP2315221	11/14/2012	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active
238794-FR-7	FR	9/17/2010	EP10177345A	EP2315221	11/14/2012	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active
238794-IT-9	IT	9/17/2010	EP10177345A	EP2315221	11/14/2012	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active

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238794-KR-5	KR	9/17/2010	KR20100091557A	KR101734547	5/11/2017	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active
238794-US-1	US	9/23/2009	US12/565127	US8354899	1/15/2013	Switch structure and method	Dolby Intellectual Property Licensing, LLC	Active
238894-CN-1	CN	11/2/2011	CN201110341544A	CN103094585	3/16/2016	Electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
238894-US-2	US	12/27/2012	US13/727666	US9159980	10/13/2015	Electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
239040-CN-2	CN	12/15/2010	CN201010616094A	CN102104280	5/18/2016	Use and share equipment and the method that power electronic devices is carried out quick charge	Dolby Intellectual Property Licensing, LLC	Active
239040-DE-7	DE	12/14/2010	EP10194998A	EP2337183	7/23/2014	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-FR-8	FR	12/14/2010	EP10194998A	EP2337183	7/23/2014	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-GB-9	GB	12/14/2010	EP10194998A	EP2337183	7/23/2014	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-JP-4	JP	12/15/2010	JP2010278693A	JP5651456	1/14/2015	Rapid charging apparatus and method using shared electric and electronic equipment	Dolby Intellectual Property Licensing, LLC	Active
239040-US-1	US	12/18/2009	US12/641359	US8698451	4/15/2014	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-10	US	9/14/2016	US15/265404	US9914365	3/13/2018	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-11	US	9/19/2017	US15/708859	US10377259	8/13/2019	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-12	US	2/18/2019	US16/278379	US10543755	1/28/2020	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-13	US	12/16/2019	US16/715508	US11400820	8/2/2022	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-15	US	10/31/2022	US17/977204	US11884168	1/30/2024	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239040-US-6	US	3/19/2014	US14/219201	US9789780	10/17/2017	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
239053-CN-2	CN	4/8/2011	CN201110093550A	CN102215508	12/14/2016	Without dividing duplex network	Dolby Intellectual Property Licensing, LLC	Active
239053-DE-5	DE	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-FI-6	FI	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-FR-7	FR	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-GB-8	GB	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-KR-4	KR	4/8/2011	KR20110032639A	KR101836486	3/8/2018	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-LU-9	LU	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-NL-10	NL	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active

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239053-SE-11	SE	4/4/2011	EP11160945A	EP2375620	6/8/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239053-US-1	US	4/9/2010	US12/757721	US9369260	6/14/2016	Division free duplexing networks	Dolby Intellectual Property Licensing, LLC	Active
239322-CN-2	CN	8/27/2010	CN201010272850A	CN102006006	10/2/2013	System and method for non-sinusoidal current waveform excitation of electrical machines	Dolby Intellectual Property Licensing, LLC	Active
239322-DE-6	DE	8/20/2010	EP10173623A	EP2290810	6/25/2014	System and method for non-sinusoidal current waveform excitation of electrical machines	Dolby Intellectual Property Licensing, LLC	Active
239322-FR-7	FR	8/20/2010	EP10173623A	EP2290810	6/25/2014	System and method for non-sinusoidal current waveform excitation of electrical machines	Dolby Intellectual Property Licensing, LLC	Active
239322-GB-8	GB	8/20/2010	EP10173623A	EP2290810	6/25/2014	System and method for non-sinusoidal current waveform excitation of electrical machines	Dolby Intellectual Property Licensing, LLC	Active
239322-IN-4	IN	8/13/2010	IN1912DE2010A	IN424264	3/10/2023	System and method for nonsinusoidal current waveform	Dolby Intellectual Property Licensing, LLC	Active
239322-JP-5	JP	8/24/2010	JP2010186779A	JP5674383	2/25/2015	System and method for exciting an electrical machine with an unrestricted current waveform	Dolby Intellectual Property Licensing, LLC	Active
239322-US-1	US	8/28/2009	US12/549437	US8222855	7/17/2012	System and method for non-sinusoidal current waveform excitation of electrical machines	Dolby Intellectual Property Licensing, LLC	Active
239382-CN-12	CN	6/29/2011	CN201510490106A	CN105006935	11/17/2017	The system and method for the non-sinusoidal current waveform stimulus of generator	Dolby Intellectual Property Licensing, LLC	Active
239382-CN-2	CN	6/29/2011	CN201110191425A	CN102315811	9/16/2015	The system and method for the non-sinusoidal current waveform stimulus of generator	Dolby Intellectual Property Licensing, LLC	Active
239382-DE-6	DE	6/22/2011	EP11170924A	EP2403129	8/13/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-FR-7	FR	6/22/2011	EP11170924A	EP2403129	8/13/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-GB-8	GB	6/22/2011	EP11170924A	EP2403129	8/13/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-IN-4	IN	6/13/2011	IN1672DE2011A	IN413958	12/9/2022	System and method for non-sinusoidal current waveform	Dolby Intellectual Property Licensing, LLC	Active
239382-IT-10	IT	6/22/2011	EP11170924A	EP2403129	8/13/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-SE-9	SE	6/22/2011	EP11170924A	EP2403129	8/13/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-US-1	US	6/29/2010	US12/826076	US8901896	12/2/2014	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239382-US-11	US	11/19/2014	US14/547315	US9118271	8/25/2015	System and method for non-sinusoidal current waveform excitation of electrical generators	Dolby Intellectual Property Licensing, LLC	Active
239428-CN-2	CN	8/11/2010	CN201010260530A	CN101992678	7/30/2014	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
239428-DE-7	DE	7/27/2010	EP10170852A	EP2284037	10/11/2023	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
239428-EP-3	EP	7/27/2010	EP10170852A	EP2284037	10/11/2023	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
239428-IN-4	IN	7/28/2010	IN1764DE2010A	IN327160	12/13/2019	System for multiple energy storage and management and	Dolby Intellectual Property Licensing, LLC	Active
239428-JP-5	JP	8/9/2010	JP2010178267A	JP5674379	2/25/2015	System for storing and managing a plurality of energies and method for producing the same	Dolby Intellectual Property Licensing, LLC	Active

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239428-US-1	US	8/11/2009	US12/539056	US8026638	9/27/2011	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
239428-US-6	US	9/2/2011	US13/224669	US8922057	12/30/2014	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
239449-CN-3	CN	8/31/2010	CN201010277436A	CN102005789	4/15/2015	Apparatus for transferring energy using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
239449-DE-9	DE	8/25/2010	EP10174013A	EP2290778	4/7/2021	Apparatus for transferring energy using onboard power electronics	Dolby Intellectual Property Licensing, LLC	Active
239449-EP-4	EP	8/25/2010	EP10174013A	EP2290778	4/7/2021	Apparatus for transferring energy using onboard power electronics	Dolby Intellectual Property Licensing, LLC	Active
239449-JP-6	JP	8/31/2010	JP2010193001A	JP6068778	1/25/2017	Device for transmitting energy using in-vehicle power electronics and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
239449-JP-8	JP	11/26/2015	JP2015230270A	JP6228586	11/8/2017	Electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
239449-US-1	US	8/31/2009	US12/550504	US8030884	10/4/2011	Apparatus for transferring energy using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
239449-US-2	US	8/31/2009	US12/550536	US8421271	4/16/2013	Apparatus for transferring energy using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
239449-US-7	US	5/2/2011	US13/099053	US8487582	7/16/2013	Apparatus for transferring energy using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
239451-CN-12	CN	7/22/2011	CN201610626550A	CN106067712	1/22/2019	High power density, high efficiency, non-permanent magnet motor	Dolby Intellectual Property Licensing, LLC	Active
239451-CN-2	CN	7/22/2011	CN201110218620A	CN102347648	8/31/2016	High power density, high efficiency, non-permanent magnet motor	Dolby Intellectual Property Licensing, LLC	Active
239451-DE-7	DE	7/14/2011	EP11173959A	EP2410639	6/11/2014	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-FR-8	FR	7/14/2011	EP11173959A	EP2410639	6/11/2014	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-GB-9	GB	7/14/2011	EP11173959A	EP2410639	6/11/2014	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-IN-4	IN	7/6/2011	[illegible]	IN334754	3/20/2020	Non-permanent magnet electric machine having high	Dolby Intellectual Property Licensing, LLC	Active
239451-IT-10	IT	7/14/2011	EP11173959A	EP2410639	6/11/2014	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-JP-5	JP	7/21/2011	JP2011159450A	JP5877968	3/8/2016	High power density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-SE-11	SE	7/14/2011	EP11173959A	EP2410639	6/11/2014	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-US-1	US	7/23/2010	US12/842142	US8310115	11/13/2012	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
239451-US-6	US	9/7/2012	US13/606080	US8587164	11/19/2013	High power-density, high efficiency, non-permanent magnet electric machine	Dolby Intellectual Property Licensing, LLC	Active
241038-CN-2	CN	1/4/2012	CN201210012987A	CN102594222	12/14/2016	Power switch system including mems (mems) array	Dolby Intellectual Property Licensing, LLC	Active

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241038-DE-6	DE	12/22/2011	EP11195092A	EP2472717	11/20/2019	Power switching system including a micro-electromechanical system (mems) array	Dolby Intellectual Property Licensing, LLC	Active
241038-EP-3	EP	12/22/2011	EP11195092A	EP2472717	11/20/2019	Power switching system including a micro-electromechanical system (mems) array	Dolby Intellectual Property Licensing, LLC	Active
241038-KR-5	KR	1/4/2012	KR20120000807A	KR101848096	5/28/2018	Power switching system including a micro-electromechanical system(mems) array	Dolby Intellectual Property Licensing, LLC	Active
241038-US-1	US	1/4/2011	US12/984338	US8350509	1/8/2013	Power switching system including a micro-electromechanical system (mems) array	Dolby Intellectual Property Licensing, LLC	Active
241238-US-1	US	8/29/2011	US13/219779	US8740793	6/3/2014	Radar based systems and methods for monitoring a subject	Dolby Intellectual Property Licensing, LLC	Active
241400-US-1	US	4/21/2010	US12/764765	US8453032	5/28/2013	Energy and space efficient detection for data storage	Dolby Intellectual Property Licensing, LLC	Active
241407-CN-2	CN	4/14/2011	CN201110102152A	CN102223643	10/21/2015	Use general method and communication system without dividing duplex	Dolby Intellectual Property Licensing, LLC	Active
241407-DE-5	DE	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-FI-7	FI	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-FR-6	FR	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-GB-8	GB	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-KR-4	KR	4/14/2011	KR20110034664A	KR101881551	8/17/2018	Generalized division free duplexing techniques for decreasing rendevous time	Dolby Intellectual Property Licensing, LLC	Active
241407-LU-9	LU	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-NL-10	NL	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-SE-11	SE	4/11/2011	EP11161812A	EP2378731	3/30/2016	Communication method for cognitive radio	Dolby Intellectual Property Licensing, LLC	Active
241407-US-1	US	4/15/2010	US12/761129	US8379584	2/19/2013	Generalized division free duplexing techniques for decreasing rendevous time	Dolby Intellectual Property Licensing, LLC	Active
241411-CN-2	CN	3/22/2011	CN201110080204A	CN102324943	8/3/2016	Dynamic and configurable sensor chassis	Dolby Intellectual Property Licensing, LLC	Active
241497-US-1	US	12/16/2009	US12/639060	US8054589	11/8/2011	Switch structure and associated circuit	Dolby Intellectual Property Licensing, LLC	Active
241504-US-1	US	11/13/2009	US12/617986	US8338055	12/25/2012	System and method for electrochemical energy conversion and storage	Dolby Intellectual Property Licensing, LLC	Active
241826-CN-2	CN	2/25/2011	CN201110045577A	CN102170185	1/6/2016	For the rotor structure of interior permanent magnet electromotive machine	Dolby Intellectual Property Licensing, LLC	Active
241826-IN-4	IN	2/17/2011	IN414DEL2011A	IN328880	1/10/2020	Rotor structure for interior permanent magnet	Dolby Intellectual Property Licensing, LLC	Active
241826-US-1	US	2/26/2010	US12/713242	US8541919	9/24/2013	Rotor structure for interior permanent magnet electromotive machine including laminations profiled along a segment of a bridge to define a concave and curved bridge profile	Dolby Intellectual Property Licensing, LLC	Active
241843-CN-2	CN	6/17/2011	CN201110175517A	CN102394199	11/25/2015	There is the mems switch array being arranged to the substrate conducting switching current	Dolby Intellectual Property Licensing, LLC	Active

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241843-DE-5	DE	6/14/2011	EP11169822A	EP2398028	8/12/2015	Means switching array having a substrate arranged to conduct switching current	Dolby Intellectual Property Licensing, LLC	Active
241843-JP-4	JP	6/10/2011	JP2011129654A	JP5802060	10/28/2015	Means switching array having a substrate configured to conduct switching current	Dolby Intellectual Property Licensing, LLC	Active
241843-US-1	US	6/17/2010	US12/817578	US8576029	11/5/2013	Means switching array having a substrate arranged to conduct switching current	Dolby Intellectual Property Licensing, LLC	Active
242316-US-1	US	6/6/2011	US13/154231	US9030921	5/12/2015	Increased spectral efficiency and reduced synchronization delay with bundled transmissions	Dolby Intellectual Property Licensing, LLC	Active
242316-US-2	US	4/7/2015	US14/680805	US9355670	5/31/2016	Increased spectral efficiency and reduced synchronization delay with bundled transmissions	Dolby Intellectual Property Licensing, LLC	Active
242399-CN-3	CN	5/27/2011	CN201110161393A	CN102263466	1/6/2016	Motor rotor conducting bar and manufacture method thereof	Dolby Intellectual Property Licensing, LLC	Active
242399-DE-8	DE	5/25/2011	EP11167545A	EP2390987	5/4/2022	Electric machine rotor bar and method of making same	Dolby Intellectual Property Licensing, LLC	Active
242399-EP-4	EP	5/25/2011	EP11167545A	EP2390987	5/4/2022	Electric machine rotor bar and method of making same	Dolby Intellectual Property Licensing, LLC	Active
242399-IN-5	IN	5/12/2011	IN1405DE2011A	IN423284	3/3/2023	Electric machine rotor bar and method of making same	Dolby Intellectual Property Licensing, LLC	Active
242399-JP-2	JP	5/18/2011	JP2011110894A	JP5997880	9/28/2016	Electric machine rotor bar and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
242399-JP-7	JP	10/28/2015	JP2015211574A	JP6106246	3/29/2017	Electric machine rotor bar and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
242399-US-1	US	5/28/2010	US12/789580	US8274190	9/25/2012	Electric machine rotor bar and method of making same	Dolby Intellectual Property Licensing, LLC	Active
242399-US-6	US	7/23/2012	US13/555363	US9438077	9/6/2016	Electric machine rotor bar and method of making same	Dolby Intellectual Property Licensing, LLC	Active
242485-CH-9	CH	3/16/2012	EP12712027A	EP2688643	3/13/2019	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242485-CN-5	CN	3/16/2012	CN201280014305A	CN103517735	1/20/2016	For the system and method for non-contact power transfer in implantable device	Dolby Intellectual Property Licensing, LLC	Active
242485-DE-8	DE	3/16/2012	EP12712027A	EP2688643	3/13/2019	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242485-EP-3	EP	3/16/2012	EP12712027A	EP2688643	3/13/2019	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242485-FR-7	FR	3/16/2012	EP12712027A	EP2688643	3/13/2019	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242485-JP-4	JP	3/16/2012	JP2014501153A	JP5990252	9/7/2016	System and method for contactless power transfer in an implantable device	Dolby Intellectual Property Licensing, LLC	Active
242485-KR-6	KR	3/16/2012	KR20137024950A	KR102013964	8/23/2019	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242485-US-1	US	3/21/2011	US13/052196	US8849402	9/30/2014	System and method for contactless power transfer in implantable devices	Dolby Intellectual Property Licensing, LLC	Active
242491-CN-3	CN	12/19/2012	CN201210553324A	CN103177742	6/20/2017	For the method and system decoded to data	Dolby Intellectual Property Licensing, LLC	Active
242491-CN-8	CN	12/19/2012	CN201210553273A	CN103177741	3/13/2018	For the method and system decoded to data	Dolby Intellectual Property Licensing, LLC	Active
242491-DE-14	DE	12/11/2012	EP12196532A	EP2608204	7/15/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active

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242491-DE-18	DE	12/11/2012	EP12196490A	EP2608203	6/24/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-EP-4	EP	12/11/2012	EP12196532A	EP2608204	7/15/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-EP-9	EP	12/11/2012	EP12196490A	EP2608203	6/24/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-FR-13	FR	12/11/2012	EP12196532A	EP2608204	7/15/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-FR-17	FR	12/11/2012	EP12196490A	EP2608203	6/24/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-GB-16	GB	12/11/2012	EP12196532A	EP2608204	7/15/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-GB-20	GB	12/11/2012	EP12196490A	EP2608203	6/24/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-JP-10	JP	12/12/2012	JP2012270873A	JP6169842	7/26/2017	Method and system for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-JP-5	JP	12/12/2012	JP2012270874A	JP6138474	5/31/2017	Method and system for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-KR-11	KR	12/20/2012	KR20120149043A	KR101995592	7/2/2019	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-KR-6	KR	12/20/2012	KR20120149061A	KR102002649	7/22/2019	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-NL-15	NL	12/11/2012	EP12196532A	EP2608204	7/15/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-NL-19	NL	12/11/2012	EP12196490A	EP2608203	6/24/2020	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-TW-12	TW	12/18/2012	TW101148138A	TWI588822	6/21/2017	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-TW-7	TW	12/18/2012	TW101148141A	TWI597722	9/1/2017	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-US-1	US	12/20/2011	US13/331625	US8493246	7/23/2013	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242491-US-2	US	12/20/2011	US13/331708	US8493247	7/23/2013	Methods and systems for decoding data	Dolby Intellectual Property Licensing, LLC	Active
242643-CN-2	CN	4/5/2012	CN201210107782A	CN102730620	12/14/2016	For improving the system and method for mems device reliability	Dolby Intellectual Property Licensing, LLC	Active
242643-DE-3	DE	3/29/2012	DE102012102727A	DE102012102727	5/17/2023	Systems and methods for increasing operational reliability of mems devices	Dolby Intellectual Property Licensing, LLC	Active
242643-US-1	US	3/31/2011	US13/077704	US8638093	1/28/2014	Systems and methods for enhancing reliability of mems devices	Dolby Intellectual Property Licensing, LLC	Active
242864-BR-2	BR	11/4/2011	BRPI1104811A	BRPI1104811	8/3/2021	Energy and storage control system	Dolby Intellectual Property Licensing, LLC	Active
242864-CN-3	CN	11/7/2011	CN201110358828A	CN102452325	9/16/2015	For to the equipment of electric vehicle charging and method	Dolby Intellectual Property Licensing, LLC	Active
242864-CN-7	CN	11/7/2011	CN201510494062A	CN105034830	4/6/2018	For the apparatus and method to electric vehicle charging	Dolby Intellectual Property Licensing, LLC	Active
242864-DE-12	DE	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active

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242864-DE-19	DE	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-EP-17	EP	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-EP-4	EP	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-ES-14	ES	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-ES-22	ES	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-FR-11	FR	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-FR-18	FR	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-GB-16	GB	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-GB-24	GB	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-IN-5	IN	10/31/2011	IN3091DE2011A	IN426417	3/24/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-IT-13	IT	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-IT-20	IT	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-JP-10	JP	7/2/2019	JP2019123413A	JP7051758	4/11/2022	The apparatus and method which charges an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-JP-6	JP	11/1/2011	JP2011239869A	JP5908254	4/26/2016	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-JP-8	JP	10/6/2015	JP2015198092A	JP6188090	8/30/2017	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-JP-9	JP	8/1/2017	JP2017148827A	JP6553133	7/31/2019	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-NL-21	NL	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-TR-15	TR	11/1/2011	EP11187387A	EP2450221	8/18/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-TR-23	TR	11/1/2011	EP21191611A	EP3981638	12/27/2023	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242864-US-1	US	11/5/2010	US12/940085	US8378623	2/19/2013	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
242903-CH-5	CH	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-CN-2	CN	11/3/2011	CN201110365774A	CN102545136	5/18/2016	Based on the switching system of mems	Dolby Intellectual Property Licensing, LLC	Active
242903-DE-6	DE	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-FI-8	FI	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active

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242903-FR-7	FR	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-GB-9	GB	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-IT-10	IT	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-JP-4	JP	10/31/2011	JP2011238092A	JP5806589	11/10/2015	Mems switching system	Dolby Intellectual Property Licensing, LLC	Active
242903-SE-11	SE	10/31/2011	EP11187315A	EP2450927	1/4/2017	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
242903-US-1	US	11/4/2010	US12/940027	US8537507	9/17/2013	Mems-based switching systems	Dolby Intellectual Property Licensing, LLC	Active
243031-US-1	US	12/22/2011	US13/335175	US8842287	9/23/2014	System and method for auto-focusing in optical coherence tomography	Dolby Intellectual Property Licensing, LLC	Active
243227-US-1	US	10/27/2011	US13/283142	US9083024	7/14/2015	Stack design for na nicl battery	Dolby Intellectual Property Licensing, LLC	Active
243942-CN-3	CN	11/18/2011	CN201110385885A	CN102570967	7/6/2016	Low inductance, high efficiency induction machine and manufacture method thereof	Dolby Intellectual Property Licensing, LLC	Active
243942-IN-5	IN	9/19/2011	IN2708DE2011A	IN334026	3/13/2020	An electric drive system comprising an induction motor, a	Dolby Intellectual Property Licensing, LLC	Active
243942-US-1	US	11/19/2010	US12/949882	US9685900	6/20/2017	Low-inductance, high-efficiency induction machine and method of making same	Dolby Intellectual Property Licensing, LLC	Active
243944-BR-2	BR	11/17/2011	BRPI1104890A	BRPI1104890	12/8/2020	Electrical control system	Dolby Intellectual Property Licensing, LLC	Active
243944-CN-3	CN	11/18/2011	CN201110457017A	CN102545774	3/30/2018	High power density, high back-emf magneto and its manufacture method	Dolby Intellectual Property Licensing, LLC	Active
243944-CN-9	CN	11/18/2011	CN201810153887A	CN108306573	4/12/2022	High power density, high anti emf permanent magnet motor and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
243944-DE-11	DE	11/15/2011	EP11189127A	EP2456065	11/14/2018	High power-density, high back emf permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
243944-EP-4	EP	11/15/2011	EP11189127A	EP2456065	11/14/2018	High power-density, high back emf permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
243944-FR-10	FR	11/15/2011	EP11189127A	EP2456065	11/14/2018	High power-density, high back emf permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
243944-GB-12	GB	11/15/2011	EP11189127A	EP2456065	11/14/2018	High power-density, high back emf permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
243944-IN-5	IN	11/18/2011	IN3297DE2011A	IN360536	3/12/2021	High powerdensity, high back emf pennanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
243944-US-1	US	11/19/2010	US12/949925	US9780716	10/3/2017	High power-density, high back emf pennanent magnet machine and method of making same	Dolby Intellectual Property Licensing, LLC	Active
243944-US-7	US	4/20/2017	US15/492544	US10946748	3/16/2021	High power-density, high back emf permanent magnet machine and method of making same	Dolby Intellectual Property Licensing, LLC	Active
243956-CN-3	CN	11/18/2011	CN201110385851A	CN102545479	3/1/2017	Integrated motor and silicon carbide power rod changer assembly and its manufacture method	Dolby Intellectual Property Licensing, LLC	Active
243963-CN-2	CN	5/27/2011	CN201110139784A	CN102263470	8/19/2015	High-speed self-cascaded electric machine	Dolby Intellectual Property Licensing, LLC	Active
243963-IN-3	IN	5/11/2011	IN1390DE2011A	IN358810	2/26/2021	High speed self cascaded electric machine	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
243963-JP-4	JP	5/20/2011	JP2011112985A	JP5869779	2/24/2016	High speed self cascaded electrical machine	Dolby Intellectual Property Licensing, LLC	Active
243963-US-1	US	5/28/2010	US12/790349	US8115434	2/14/2012	High-speed self-cascaded electric machine	Dolby Intellectual Property Licensing, LLC	Active
244088-US-1	US	8/13/2010	US12/855919	US9059484	6/16/2015	Rechargeable electrochemical cell and method of manufacturing a rechargeable electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
244092-CN-2	CN	7/27/2012	CN201210263056A	CN103294168	8/8/2017	Distribution system	Dolby Intellectual Property Licensing, LLC	Active
244092-FR-7	FR	7/26/2012	EP12178134A	EP2551866	4/2/2014	Electrical distribution system	Dolby Intellectual Property Licensing, LLC	Active
244092-GB-8	GB	7/26/2012	EP12178134A	EP2551866	4/2/2014	Electrical distribution system	Dolby Intellectual Property Licensing, LLC	Active
244092-IT-6	IT	7/26/2012	EP12178134A	EP2551866	4/2/2014	Electrical distribution system	Dolby Intellectual Property Licensing, LLC	Active
244092-JP-4	JP	7/25/2012	JP2012164288A	JP5973274	8/23/2016	Electric distribution system	Dolby Intellectual Property Licensing, LLC	Active
244092-US-1	US	7/29/2011	US13/194002	US8916996	12/23/2014	Electrical distribution system	Dolby Intellectual Property Licensing, LLC	Active
244295-US-1	US	4/16/2010	US12/761597	US8516302	8/20/2013	Automatic error control scheme selection for fixed-length messages based upon message payload size	Dolby Intellectual Property Licensing, LLC	Active
244409-US-1	US	9/24/2010	US12/889663	US8600123	12/3/2013	System and method for contactless multi-fingerprint collection	Dolby Intellectual Property Licensing, LLC	Active
244409-US-2	US	10/17/2013	US14/056256	US9342728	5/17/2016	System and method for contactless multi-fingerprint collection	Dolby Intellectual Property Licensing, LLC	Active
245157-US-1	US	12/22/2010	US12/976453	US8852786	10/7/2014	Ceramic-metal sealing structure, and associated method	Dolby Intellectual Property Licensing, LLC	Active
245295-US-1	US	12/14/2010	US12/967291	US8778568	7/15/2014	Optical data storage media and methods for using the same	Dolby Intellectual Property Licensing, LLC	Active
245866-US-1	US	12/15/2010	US12/968510	US8674218	3/18/2014	Restraint system for an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
246173-US-1	US	12/21/2010	US12/974512	US8665591	3/4/2014	Systems and methods to thermally manage electronic devices	Dolby Intellectual Property Licensing, LLC	Active
246181-US-1	US	1/11/2011	US13/004757	US8749237	6/10/2014	Optically controlled mems switch and method of using the same	Dolby Intellectual Property Licensing, LLC	Active
246181-US-2	US	3/4/2014	US14/196235	US9676613	6/13/2017	Optically controlled mems switch and method of using the same	Dolby Intellectual Property Licensing, LLC	Active
246390-CN-1	CN	8/9/2012	CN201210281434A	CN103579689	12/16/2015	The manufacture method of electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
246484-BR-2	BR	11/3/2011	BRPI1104833A	BRPI1104833	6/2/2020	Electronic energy driving circuit	Dolby Intellectual Property Licensing, LLC	Active
246484-CN-3	CN	11/7/2011	CN201110379597A	CN102457087	6/15/2016	Use equipment and the manufacture method thereof of the onboard power electronics transfer energy with high-frequency transformer isolation	Dolby Intellectual Property Licensing, LLC	Active
246484-CN-8	CN	11/7/2011	CN201610329902A	CN106026318	12/31/2019	Device for transferring energy using on-board power electronics with high-frequency transformer isolation and method for manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
246484-DE-10	DE	11/1/2011	EP11187389A	EP2450222	10/2/2019	Apparatus for transferring energy using onboard power electronics with high-frequency transformer isolation and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active

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246484-EP-4	EP	11/1/2011	EP11187389A	EP2450222	10/2/2019	Apparatus for transferring energy using onboard power electronics with high-frequency transformer isolation and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
246484-FR-9	FR	11/1/2011	EP11187389A	EP2450222	10/2/2019	Apparatus for transferring energy using onboard power electronics with high-frequency transformer isolation and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
246484-IN-5	IN	11/2/2011	IN3123DE2011A	IN334354	3/13/2020	Apparatus for transferring energy using onboard power	Dolby Intellectual Property Licensing, LLC	Active
246484-JP-6	JP	10/31/2011	JP2011238096A	JP6093497	3/8/2017	Apparatus for energy transfer using on-board power electronic circuit with high frequency transformer isolation and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
246484-US-1	US	11/5/2010	US12/940110	US9290097	3/22/2016	Apparatus for transferring energy using onboard power electronics with high-frequency transformer isolation and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
246484-US-7	US	3/17/2016	US15/073061	US10454290	10/22/2019	Apparatus for transferring energy using onboard power electronics with high-frequency transformer isolation and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
246498-US-1	US	12/22/2011	US13/335211	US9273950	3/1/2016	System and method for auto-ranging in optical coherence tomography	Dolby Intellectual Property Licensing, LLC	Active
246687-US-1	US	1/14/2011	US13/007123	US8697279	4/15/2014	Composition and energy storage device	Dolby Intellectual Property Licensing, LLC	Active
246740-US-1	US	5/31/2011	US13/118663	US9027236	5/12/2015	Resonator structures and method of making	Dolby Intellectual Property Licensing, LLC	Active
246897-US-1	US	9/29/2011	US13/248671	US9306195	4/5/2016	Electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
246939-CA-3	CA	12/22/2011	CA2762711A	CA2762711	1/8/2019	Electric motor structure to minimize electro-magnetic interference	Dolby Intellectual Property Licensing, LLC	Active
246939-US-1	US	12/23/2010	US12/977800	US9343939	5/17/2016	Electric motor structure to minimize electro-magnetic interference	Dolby Intellectual Property Licensing, LLC	Active
246995-CN-1	CN	12/8/2011	CN201110404956A	CN103165900	3/30/2016	A kind of alkali metal-metal halide battery	Dolby Intellectual Property Licensing, LLC	Active
247031-US-1	US	11/17/2011	US13/299021	US8580463	11/12/2013	Reactants for optical data storage media and methods for use	Dolby Intellectual Property Licensing, LLC	Active
247141-US-1	US	1/31/2011	US13/017551	US9153844	10/6/2015	System and methods of using a sodium metal halide cell	Dolby Intellectual Property Licensing, LLC	Active
247243-IN-3	IN	12/22/2011	IN3785DE2011A	IN348971	10/16/2020	Composition, energy storage device, and related processes	Dolby Intellectual Property Licensing, LLC	Active
247243-US-1	US	12/23/2010	US12/977471	US8603671	12/10/2013	Composition, energy storage device, and related processes	Dolby Intellectual Property Licensing, LLC	Active
247255-CN-2	CN	4/18/2012	CN201210129883A	CN102799492	2/9/2018	System, method and apparatus for solving error in systems	Dolby Intellectual Property Licensing, LLC	Active
247255-DE-6	DE	4/16/2012	EP12164343A	EP2515234	6/17/2020	System, method, and apparatus for resolving errors in a system	Dolby Intellectual Property Licensing, LLC	Active
247255-EP-3	EP	4/16/2012	EP12164343A	EP2515234	6/17/2020	System, method, and apparatus for resolving errors in a system	Dolby Intellectual Property Licensing, LLC	Active
247255-FR-5	FR	4/16/2012	EP12164343A	EP2515234	6/17/2020	System, method, and apparatus for resolving errors in a system	Dolby Intellectual Property Licensing, LLC	Active
247255-GB-7	GB	4/16/2012	EP12164343A	EP2515234	6/17/2020	System, method, and apparatus for resolving errors in a system	Dolby Intellectual Property Licensing, LLC	Active

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247255-US-1	US	4/18/2011	US13/089002	US8862938	10/14/2014	System, method. and apparatus for resolving errors in a system	Dolby Intellectual Property Licensing, LLC	Active
247550-CN-4	CN	7/13/2016	CN201610548900A	CN106365727	12/22/2020	Electrochemical cell comprising a conductive matrix	Dolby Intellectual Property Licensing, LLC	Active
247550-KR-5	KR	7/8/2016	KR20160086687A	KR101941655	1/24/2019	Electrochemical cells including a conductive matrix	Dolby Intellectual Property Licensing, LLC	Active
247550-US-3	US	7/13/2015	US14/797679	US9577297	2/21/2017	Electrochemical cells including a conductive matrix	Dolby Intellectual Property Licensing, LLC	Active
247784-CH-7	CH	6/6/2012	EP12171099A	EP2672562	8/8/2018	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
247784-CN-2	CN	6/8/2012	CN201210336184A	CN103487755	2/17/2016	For predicting the system and method for power of battery transmission performance	Dolby Intellectual Property Licensing, LLC	Active
247784-DE-6	DE	6/6/2012	EP12171099A	EP2672562	8/8/2018	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
247784-EP-3	EP	6/6/2012	EP12171099A	EP2672562	8/8/2018	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
247784-FR-5	FR	6/6/2012	EP12171099A	EP2672562	8/8/2018	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
247784-GB-8	GB	6/6/2012	EP12171099A	EP2672562	8/8/2018	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
247784-JP-4	JP	6/7/2012	JP2012129409A	JP5674713	2/25/2015	System and method for predicting battery power supply performance	Dolby Intellectual Property Licensing, LLC	Active
247784-US-1	US	4/27/2011	US13/095743	US8872481	10/28/2014	Systems and methods for predicting battery power-delivery performance	Dolby Intellectual Property Licensing, LLC	Active
248221-DE-8	DE	3/28/2012	EP12161924A	EP2506189	11/27/2019	Apparatus for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-EP-2	EP	3/28/2012	EP12161924A	EP2506189	11/27/2019	Apparatus for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-FR-7	FR	3/28/2012	EP12161924A	EP2506189	11/27/2019	Apparatus for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-GB-9	GB	3/28/2012	EP12161924A	EP2506189	11/27/2019	Apparatus for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-JP-3	JP	3/28/2012	JP2012072648A	JP5928792	6/1/2016	Apparatus and method for non-contact high resolution bill capture	Dolby Intellectual Property Licensing, LLC	Active
248221-SG-5	SG	3/22/2012	SG102014059993WA	SG10201405993W	11/27/2014	Apparatus and method for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-US-1	US	3/30/2011	US13/075694	US8971588	3/3/2015	Apparatus and method for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248221-US-6	US	2/18/2015	US14/624639	US9536127	1/3/2017	Apparatus and method for contactless high resolution handprint capture	Dolby Intellectual Property Licensing, LLC	Active
248672-US-1	US	9/30/2011	US13/249830	US8816635	8/26/2014	Charging system using sodium level control in individual sealed anode tubes	Dolby Intellectual Property Licensing, LLC	Active
248678-BR-2	BR	3/22/2012	BR102012006427A	BR102012006427	9/24/2020	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
248678-CN-3	CN	3/23/2012	CN201210162119A	CN102689603	3/1/2017	For supplying system and its manufacture method of promotion energy from process auxiliary drive	Dolby Intellectual Property Licensing, LLC	Active
248678-CN-7	CN	3/23/2012	CN201611198513A	CN106956593	11/29/2019	For the system and its manufacturing method from auxiliary drive supply promotion energy	Dolby Intellectual Property Licensing, LLC	Active

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248678-DE-8	DE	3/22/2012	EP12160730A	EP2502773	6/12/2019	System for supplying propulsion energy from an auxiliary drive and method of making same	Dolby Intellectual Property Licensing, LLC	Active
248678-EP-4	EP	3/22/2012	EP12160730A	EP2502773	6/12/2019	System for supplying propulsion energy from an auxiliary drive and method of making same	Dolby Intellectual Property Licensing, LLC	Active
248678-IN-5	IN	3/13/2012	IN716DE2012A	IN402320	8/5/2022	System for supplying propulsion energy from an auxiliary	Dolby Intellectual Property Licensing, LLC	Active
248678-JP-6	JP	3/16/2012	JP2012059519A	JP6247811	12/13/2017	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
248678-US-1	US	3/23/2011	US13/069533	US8761978	6/24/2014	System for supplying propulsion energy from an auxiliary drive and method of making same	Dolby Intellectual Property Licensing, LLC	Active
248986-CN-4	CN	10/25/2012	CN201280059325A	CN103959418	10/19/2016	Micro-electromechanical switch and correlation technique thereof	Dolby Intellectual Property Licensing, LLC	Active
248986-DE-3	DE	10/25/2012	DE112012005009T	DE112012005009	9/4/2014	Microelectromechanical switch and associated method therefor	Dolby Intellectual Property Licensing, LLC	Active
249037-CN-1	CN	11/16/2011	CN201110363333A	CN103116074	9/7/2016	The change detection of ac network phase place and compensation system and method	Dolby Intellectual Property Licensing, LLC	Active
249074-DE-6	DE	1/16/2013	EP13151418A	EP2617688	5/2/2018	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
249074-FR-7	FR	1/16/2013	EP13151418A	EP2617688	5/2/2018	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
249074-GB-5	GB	1/16/2013	EP13151418A	EP2617688	5/2/2018	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
249074-JP-2	JP	1/8/2013	JP2013000762A	JP6105958	3/29/2017	Sodium battery	Dolby Intellectual Property Licensing, LLC	Active
249074-KR-3	KR	1/17/2013	KR20130005183A	KR102009796	8/13/2019	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
249074-US-1	US	1/19/2012	US13/354101	US9067818	6/30/2015	Sealing glass composition and article	Dolby Intellectual Property Licensing, LLC	Active
249090-CH-9	CH	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-DE-4	DE	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-FI-10	FI	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-FR-5	FR	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-GB-6	GB	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-IT-7	IT	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-JP-3	JP	9/20/2013	JP2013194762A	JP6243674	12/6/2017	Switching device including a gate circuit for operating a microelectromechanical system (mems) switch	Dolby Intellectual Property Licensing, LLC	Active

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249090-SE-8	SE	9/26/2013	EP13186251A	EP2713379	12/20/2017	A switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249090-US-1	US	9/28/2012	US13/630122	US8659326	2/25/2014	Switching apparatus including gating circuitry for actuating micro-electromechanical system (mems) switches	Dolby Intellectual Property Licensing, LLC	Active
249187-US-2	US	2/14/2013	US13/767048	US9130249	9/8/2015	Battery cell design and method of cooling battery cells	Dolby Intellectual Property Licensing, LLC	Active
249391-CN-1	CN	3/23/2012	CN201210080623A	CN103326350	3/16/2016	Inverter controller, energy conversion system, photovoltaic energy conversion system and method	Dolby Intellectual Property Licensing, LLC	Active
250154-DE-6	DE	12/6/2012	EP12195915A	EP2613497	3/6/2019	Method of transporting data in a sub-segmented manner	Dolby Intellectual Property Licensing, LLC	Active
250154-EP-4	EP	12/6/2012	EP12195915A	EP2613497	3/6/2019	Method of transporting data in a sub-segmented manner	Dolby Intellectual Property Licensing, LLC	Active
250154-FR-5	FR	12/6/2012	EP12195915A	EP2613497	3/6/2019	Method of transporting data in a sub-segmented manner	Dolby Intellectual Property Licensing, LLC	Active
250154-GB-7	GB	12/6/2012	EP12195915A	EP2613497	3/6/2019	Method of transporting data in a sub-segmented manner	Dolby Intellectual Property Licensing, LLC	Active
250154-JP-2	JP	12/4/2012	JP2012264822A	JP6148459	6/14/2017	How to transport data from a source node to a destination node	Dolby Intellectual Property Licensing, LLC	Active
250154-KR-3	KR	12/7/2012	KR20120142091A	KR102046792	11/20/2019	Method of transporting data from sending node to destination node	Dolby Intellectual Property Licensing, LLC	Active
250154-US-1	US	12/9/2011	US13/315955	US8976814	3/10/2015	Method of transporting data from sending node to destination node	Dolby Intellectual Property Licensing, LLC	Active
250286-US-1	US	3/20/2011	US13/052097	US8478077	7/2/2013	Optimal gradient pursuit for image alignment	Dolby Intellectual Property Licensing, LLC	Active
250286-US-7	US	7/1/2013	US13/932763	US8768100	7/1/2014	Optimal gradient pursuit for image alignment	Dolby Intellectual Property Licensing, LLC	Active
250455-CH-13	CH	12/18/2012	EP12197725A	EP2610943	2/15/2017	Rechargeable battery with insulating compression means between the cover and the cells and method of assembling the battery	Dolby Intellectual Property Licensing, LLC	Active
250455-DE-11	DE	12/18/2012	EP12197725A	EP2610943	2/15/2017	Rechargeable battery with insulating compression means between the cover and the cells and method of assembling the battery	Dolby Intellectual Property Licensing, LLC	Active
250455-FR-10	FR	12/18/2012	EP12197725A	EP2610943	2/15/2017	Rechargeable battery with insulating compression means between the cover and the cells and method of assembling the battery	Dolby Intellectual Property Licensing, LLC	Active
250455-GB-9	GB	12/18/2012	EP12197725A	EP2610943	2/15/2017	Rechargeable battery with insulating compression means between the cover and the cells and method of assembling the battery	Dolby Intellectual Property Licensing, LLC	Active
250455-IN-3	IN	12/10/2012	IN3778DE2012A	IN430715	5/5/2023	Rechargeable battery and method	Dolby Intellectual Property Licensing, LLC	Active
250455-IT-12	IT	12/18/2012	EP12197725A	EP2610943	2/15/2017	Rechargeable battery with insulating compression means between the cover and the cells and method of assembling the battery	Dolby Intellectual Property Licensing, LLC	Active
250455-JP-5	JP	12/25/2012	JP2012280441A	JP6148463	6/14/2017	Rechargeable storage battery and method	Dolby Intellectual Property Licensing, LLC	Active

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250455-KR-7	KR	12/28/2012	KR20120155823A	KR102037985	10/29/2019	Rechargeable battery with insulating compression means between cover and cells and assembling method thereof	Dolby Intellectual Property Licensing, LLC	Active
250455-US-8	US	5/9/2016	US15/149523	US10270072	4/23/2019	Rechargeable battery and method	Dolby Intellectual Property Licensing, LLC	Active
250455-ZA-4	ZA	12/14/2012	ZA201209558A	ZA201209558	12/23/2014	Rechargeable battery and method	Dolby Intellectual Property Licensing, LLC	Active
250744-US-1	US	12/29/2011	US13/339677	US9647470	5/9/2017	Rechargeable battery system	Dolby Intellectual Property Licensing, LLC	Active
250841-CA-3	CA	8/9/2012	CA2785405A	CA2785405	9/10/2019	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-CH-15	CH	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-CN-4	CN	8/13/2012	CN201210286078A	CN103116739	11/24/2017	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-DE-11	DE	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-EP-5	EP	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-ES-14	ES	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-FR-10	FR	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-GB-16	GB	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-IN-6	IN	8/8/2012	IN2483DE2012A	IN450468	9/15/2023	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-IT-12	IT	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-JP-7	JP	8/10/2012	JP2012177773A	JP6081101	2/15/2017	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-KR-8	KR	8/13/2012	KR20120088526A	KR102001678	7/18/2019	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-NL-13	NL	8/10/2012	EP12180159A	EP2581877	4/7/2021	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-US-1	US	10/13/2011	US13/272424	US8340456	12/25/2012	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
250841-US-9	US	12/19/2012	US13/719534	US8737756	5/27/2014	System and method for depth from defocus imaging	Dolby Intellectual Property Licensing, LLC	Active
251009-DE-2	DE	11/22/2012	DE102012111303A	DE102012111303	6/6/2013	Usage measurement methods and systems for interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251009-JP-5	JP	11/26/2012	JP2012257006A	JP6267861	1/24/2018	Usage measurement techniques and systems for interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251009-KR-6	KR	11/29/2012	KR20120137208A	KR102054443	12/10/2019	Usage measurement techniques and systems for interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251336-US-1	US	10/28/2011	US13/283931	US8829719	9/9/2014	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251344-CN-2	CN	7/2/2012	CN201210242220A	CN102982753	10/17/2017	Personage tracks and interactive advertisement	Dolby Intellectual Property Licensing, LLC	Active

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251344-GB-4	GB	6/28/2012	GB201211505A	GB2494235	8/30/2017	Person tracking and interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251344-JP-5	JP	6/29/2012	JP2012146222A	JP6074177	2/1/2017	Person tracking and interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251344-KR-6	KR	6/29/2012	KR20120071337A	KR101983337	5/28/2019	Person tracking and interactive advertising	Dolby Intellectual Property Licensing, LLC	Active
251400-CN-2	CN	10/26/2012	CN201210414745A	CN103085675	3/1/2017	For optionally making the energy be coupled in system and its manufacture method of load	Dolby Intellectual Property Licensing, LLC	Active
251400-CN-4	CN	10/26/2012	CN201710024810A	CN107054091	8/28/2020	System for selectively coupling an energy source to a load and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251400-US-1	US	10/28/2011	US13/283748	US9073438	7/7/2015	System for selectively coupling an energy source to a load and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251400-US-3	US	6/2/2015	US14/728738	US10666045	5/26/2020	System for selectively coupling an energy source to a load and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251400-US-5	US	3/27/2019	US16/366449	US10958069	3/23/2021	System for selectively coupling an energy source to a load and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251417-US-1	US	10/28/2011	US13/283983	US8916993	12/23/2014	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251417-US-2	US	12/5/2014	US14/562042	US9809128	11/7/2017	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251425-US-1	US	10/28/2011	US13/283829	US9000614	4/7/2015	System for multiple energy storage and management and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251485-US-1	US	9/16/2011	US13/234942	US8901463	12/2/2014	Thermal management device	Dolby Intellectual Property Licensing, LLC	Active
251698-US-1	US	11/30/2011	US13/307191	US8928259	1/6/2015	Modular stacked dc architecture traction system and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251698-US-2	US	1/5/2015	US14/589195	US9586496	3/7/2017	Modular stacked dc architecture traction system and method of making same	Dolby Intellectual Property Licensing, LLC	Active
251698-US-3	US	1/25/2017	US15/415195	US10044312	8/7/2018	Modular stacked dc architecture traction system and method of making same	Dolby Intellectual Property Licensing, LLC	Active
252096-US-1	US	1/8/2009	US29/330540	USD645043	9/13/2011	Display	Dolby Intellectual Property Licensing, LLC	Active
252198-US-1	US	12/14/2011	US13/325731	US8829886	9/9/2014	Systems and methods for defect detection using exoelectrons	Dolby Intellectual Property Licensing, LLC	Active
252223-CA-6	CA	12/5/2012	CA2861780A	CA2861780	4/14/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-CN-3	CN	12/5/2012	CN201280070859A	CN104137322	3/8/2017	For controlling the method and system of energy accumulating device	Dolby Intellectual Property Licensing, LLC	Active
252223-DE-8	DE	12/5/2012	EP12814026A	EP2798693	3/4/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-EP-4	EP	12/5/2012	EP12814026A	EP2798693	3/4/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-FR-7	FR	12/5/2012	EP12814026A	EP2798693	3/4/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-GB-10	GB	12/5/2012	EP12814026A	EP2798693	3/4/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-IT-9	IT	12/5/2012	EP12814026A	EP2798693	3/4/2020	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active

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252223-JP-5	JP	12/5/2012	JP2014550312A	JP6027630	11/16/2016	Method and system for controlling an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252223-US-1	US	12/28/2011	US13/338380	US9147910	9/29/2015	Method and system for controlling energy storage device	Dolby Intellectual Property Licensing, LLC	Active
252310-BR-2	BR	8/10/2012	BR102012020043A	BR102012020043	11/17/2020	Multi-energy storage device system, method of mounting a propulsion power system and computer-readable storage medium	Dolby Intellectual Property Licensing, LLC	Active
252310-CN-3	CN	8/13/2012	CN201210286067A	CN102951034	8/3/2016	For optimizing the system and method for energy storing device cycle life	Dolby Intellectual Property Licensing, LLC	Active
252310-EP-4	EP	8/9/2012	EP12179967A	EP2556988	2/13/2013	System and method for optimizing energy storage device cycle life	Dolby Intellectual Property Licensing, LLC	Active
252310-US-1	US	8/12/2011	US13/209138	US8963365	2/24/2015	System and method for optimizing energy storage device cycle life	Dolby Intellectual Property Licensing, LLC	Active
252382-BR-2	BR	8/16/2012	BR102012020586A	BR102012020586	10/27/2020	Energy management and storage system	Dolby Intellectual Property Licensing, LLC	Active
252382-CN-3	CN	8/24/2012	CN201210304501A	CN102957188	11/7/2017	For the apparatus and method to electric vehicle charging	Dolby Intellectual Property Licensing, LLC	Active
252382-DE-8	DE	8/15/2012	EP12180556A	EP2562030	12/22/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252382-EP-4	EP	8/15/2012	EP12180556A	EP2562030	12/22/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252382-FR-7	FR	8/15/2012	EP12180556A	EP2562030	12/22/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252382-GB-9	GB	8/15/2012	EP12180556A	EP2562030	12/22/2021	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252382-JP-6	JP	8/17/2012	JP2012180693A	JP6130634	5/17/2017	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252382-US-1	US	8/24/2011	US13/216590	US8994327	3/31/2015	Apparatus and method for charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
252471-US-1	US	11/28/2011	US13/304791	US9520741	12/13/2016	System for charging electrical storage device and method of making same	Dolby Intellectual Property Licensing, LLC	Active
252665-CN-1	CN	11/10/2011	CN201110355846A	CN103107760	5/25/2016	Motor control method and system	Dolby Intellectual Property Licensing, LLC	Active
252665-DE-6	DE	11/7/2012	EP12191698A	EP2592747	3/7/2018	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-ES-10	ES	11/7/2012	EP12191698A	EP2592747	3/7/2018	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-FR-7	FR	11/7/2012	EP12191698A	EP2592747	3/7/2018	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-GB-8	GB	11/7/2012	EP12191698A	EP2592747	3/7/2018	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-IN-3	IN	10/25/2012	IN3295DE2012A	IN421291	2/17/2023	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-IT-9	IT	11/7/2012	EP12191698A	EP2592747	3/7/2018	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active
252665-JP-4	JP	11/6/2012	JP2012244033A	JP6302158	3/28/2018	Method and system for controlling a motor	Dolby Intellectual Property Licensing, LLC	Active
252665-US-5	US	11/9/2012	US13/673240	US8963460	2/24/2015	Method and system for controlling motor	Dolby Intellectual Property Licensing, LLC	Active

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252995-US-2	US	8/27/2012	US13/595541	US8757471	6/24/2014	Active braze techniques on beta-alumina	Dolby Intellectual Property Licensing, LLC	Active
253004-US-1	US	3/28/2013	US13/852690	US9735401	8/15/2017	Sealed sodium-based thermal batteries and methods of sealing same	Dolby Intellectual Property Licensing, LLC	Active
253010-US-1	US	4/30/2012	US13/459840	US8524348	9/3/2013	Stacked film optical data storage device and method of manufacture	Dolby Intellectual Property Licensing, LLC	Active
253610-CN-1	CN	2/17/2012	CN201210037209A	CN103259488	4/27/2016	Motor control method, control system and control device	Dolby Intellectual Property Licensing, LLC	Active
253755-CN-1	CN	2/17/2012	CN201210038096A	CN103259281	12/16/2015	There is energy conversion system and the method for negative-sequence current compensation mechanism	Dolby Intellectual Property Licensing, LLC	Active
253831-JP-2	JP	10/24/2012	JP2012234250A	JP6194164	9/6/2017	Apparatus and method for quickly charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
253831-US-1	US	10/31/2011	US13/285983	US8829722	9/9/2014	Apparatus and method for rapidly charging an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
254250-US-1	US	6/26/2012	US13/533192	US9102119	8/11/2015	Encapsulated beam and method of forming	Dolby Intellectual Property Licensing, LLC	Active
254250-US-2	US	7/14/2015	US14/798837	US10183467	1/22/2019	Encapsulated beam and method of forming	Dolby Intellectual Property Licensing, LLC	Active
254256-US-1	US	11/29/2011	US13/305817	US9290107	3/22/2016	System and method for energy management in an electric vehicle	Dolby Intellectual Property Licensing, LLC	Active
254472-DE-4	DE	1/10/2013	EP13701179A	EP2810323	5/30/2018	Electrode compositions, energy storage devices and related methods	Dolby Intellectual Property Licensing, LLC	Active
254472-FR-5	FR	1/10/2013	EP13701179A	EP2810323	5/30/2018	Electrode compositions, energy storage devices and related methods	Dolby Intellectual Property Licensing, LLC	Active
254472-GB-6	GB	1/10/2013	EP13701179A	EP2810323	5/30/2018	Electrode compositions, energy storage devices and related methods	Dolby Intellectual Property Licensing, LLC	Active
254472-IT-7	IT	1/10/2013	EP13701179A	EP2810323	5/30/2018	Electrode compositions, energy storage devices and related methods	Dolby Intellectual Property Licensing, LLC	Active
254472-US-1	US	1/30/2012	US13/361317	US8993169	3/31/2015	Electrode compositions, energy storage devices and related methods	Dolby Intellectual Property Licensing, LLC	Active
254566-CN-1	CN	4/24/2012	CN201210122557A	CN103378603	3/1/2017	Open-circuit fault detection device, inverter controller, energy conversion system and method	Dolby Intellectual Property Licensing, LLC	Active
254869-CH-14	CH	10/22/2012	EP12189424A	EP2587607	7/12/2017	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-CN-4	CN	10/25/2012	CN201210412388A	CN103078389	9/12/2017	Integrated power system control method and the relevant device with energy storage elements	Dolby Intellectual Property Licensing, LLC	Active
254869-DE-13	DE	10/22/2012	EP12189424A	EP2587607	7/12/2017	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-FR-12	FR	10/22/2012	EP12189424A	EP2587607	7/12/2017	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-GB-15	GB	10/22/2012	EP12189424A	EP2587607	7/12/2017	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-ID-6	ID	10/22/2012	P00201200893	N/A	5/17/2019		Dolby Intellectual Property Licensing, LLC	Active
254869-JP-8	JP	10/23/2012	JP2012233358A	JP6188120	8/30/2017	Integrated power generation system control method with energy storage element and related apparatus	Dolby Intellectual Property Licensing, LLC	Active
254869-MY-9	MY	10/5/2012	MYPI2012004461A	MY166391	6/25/2018	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active

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254869-NG-11	NG	4/11/2013	NGC2013296	N/A	2/25/2014		Dolby Intellectual Property Licensing, LLC	Active
254869-US-2	US	7/12/2012	US13/547250	US9496748	11/15/2016	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-US-3	US	7/13/2012	US13/548665	US9257868	2/9/2016	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254869-ZA-10	ZA	10/10/2012	ZA201207611 A	ZA201207611	10/29/2014	Integrated power system control method and related apparatus with energy storage element	Dolby Intellectual Property Licensing, LLC	Active
254975-AU-2	AU	8/29/2012	AU201221650 1A	AU2012216 501	8/4/2016	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-CN-3	CN	9/6/2012	CN201210326 909A	CN102983566	4/12/2017	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-CN-7	CN	9/6/2012	CN201710149 835A	CN106877341	6/30/2020	Controller and method for controlling power system	Dolby Intellectual Property Licensing, LLC	Active
254975-DE-8	DE	8/30/2012	EP12182470A	EP2568561	10/2/2019	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-EP-4	EP	8/30/2012	EP12182470A	EP2568561	10/2/2019	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-JP-5	JP	9/4/2012	JP2012193660 A	JP6068063	1/25/2017	Controller and method for controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-KR-6	KR	9/5/2012	KR201200981 31A	KR1019984 1	7/9/2019	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254975-US-1	US	9/6/2011	US13/225975	US8326467	12/4/2012	Controller and method of controlling a power system	Dolby Intellectual Property Licensing, LLC	Active
254993-US-1	US	12/28/2011	US13/338325	US8916285	12/23/2014	Modular high temperature battery electrical configurations	Dolby Intellectual Property Licensing, LLC	Active
256271-US-1	US	11/7/2011	US13/290928	US9305357	4/5/2016	Automatic surveillance video matting using a shape prior	Dolby Intellectual Property Licensing, LLC	Active
256271-US-2	US	2/29/2016	US15/056669	US10147021	12/4/2018	Automatic surveillance video matting using a shape prior	Dolby Intellectual Property Licensing, LLC	Active
256289-US-1	US	2/23/2012	US13/403030	US8750566	6/10/2014	Apparatus and method for spatially relating views of sky images acquired at spaced apart locations	Dolby Intellectual Property Licensing, LLC	Active
256606-BR-10	BR	5/24/2013	BR102013012 941A	BR1020130129 41	4/30/2019	Strong welder allocation and electrochemical cell composition	Dolby Intellectual Property Licensing, LLC	Active
256606-BR-11	BR	5/24/2013	BR102013012 938A	BR1020130129 38	4/30/2019	Composition of bolding alloy and electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
256606-DE-21	DE	5/24/2013	EP13169250A	EP2666582	7/3/2019	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-DE-24	DE	5/24/2013	EP13169240A	EP2666581	9/9/2020	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-EP-13	EP	5/24/2013	EP13169250A	EP2666582	7/3/2019	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-EP-5	EP	5/24/2013	EP13169240A	EP2666581	9/9/2020	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-GB-23	GB	5/24/2013	EP13169250A	EP2666582	7/3/2019	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-GB-26	GB	5/24/2013	EP13169240A	EP2666581	9/9/2020	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active

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256606-IN-14	IN	5/7/2013	IN1351DE2013A	IN448141	9/1/2023	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-IN-6	IN	5/7/2013	IN1350DE2013A	IN398874	6/17/2022	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-IT-22	IT	5/24/2013	EP13169250A	EP2666582	7/3/2019	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-IT-25	IT	5/24/2013	EP13169240A	EP2666581	9/9/2020	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-JP-15	JP	5/22/2013	JP2013107544A	JP6266232	1/24/2018	Brazing composition and related equipment	Dolby Intellectual Property Licensing, LLC	Active
256606-JP-7	JP	5/22/2013	JP2013107545A	JP6266233	1/24/2018	Brazing composition and related equipment	Dolby Intellectual Property Licensing, LLC	Active
256606-KR-8	KR	5/22/2013	KR20130057600A	KR1021625409	10/8/2020	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256606-US-2	US	6/29/2012	US13/538203	US10105795	10/23/2018	Braze compositions, and related devices	Dolby Intellectual Property Licensing, LLC	Active
256975-CN-1	CN	12/3/2012	CN201210509493A	CN103847530	4/12/2017	Electric drive system and energy managing method thereof	Dolby Intellectual Property Licensing, LLC	Active
256975-EP-4	EP	12/2/2013	EP13195375A	EP2738036	6/4/2014	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-JP-3	JP	11/29/2013	JP2013246847A	JP6334147	5/30/2018	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-JP-7	JP	5/7/2018	JP2018089123A	JP6672372	3/25/2020	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-JP-8	JP	5/7/2018	JP2018089124A	JP6672373	3/25/2020	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-US-11	US	5/4/2020	US16/866028	US11374508	6/28/2022	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-US-2	US	12/2/2013	US14/094086	US9800182	10/24/2017	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-US-5	US	3/8/2017	US15/453218	US10374529	8/6/2019	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-US-6	US	9/1/2017	US15/693976	US10291158	5/14/2019	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
256975-US-9	US	6/6/2019	US16/433348	US10673358	6/2/2020	Electric drive system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
257013-BR-6	BR	3/10/2014	BR102014005475A	BR1020140054475	4/20/2021	Engine drive system	Dolby Intellectual Property Licensing, LLC	Active
257013-CN-1	CN	3/14/2013	CN201310082173A	CN104052373	4/12/2017	Motor fault protection system and method	Dolby Intellectual Property Licensing, LLC	Active
257013-DE-8	DE	3/11/2014	EP14158838A	EP2779416	7/13/2022	System for fault protection of a motor	Dolby Intellectual Property Licensing, LLC	Active
257013-EP-4	EP	3/11/2014	EP14158838A	EP2779416	7/13/2022	System for fault protection of a motor	Dolby Intellectual Property Licensing, LLC	Active
257013-IN-5	IN	3/10/2014	IN1201CH2014A	IN431908	5/19/2023	System and method for fault protection of a motor	Dolby Intellectual Property Licensing, LLC	Active
257013-JP-3	JP	3/11/2014	JP2014047009A	JP6285223	2/28/2018	System and method for motor fault protection	Dolby Intellectual Property Licensing, LLC	Active

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257013-US-2	US	3/12/2014	US14/205489	US9438144	9/6/2016	System and method for fault protection of a motor	Dolby Intellectual Property Licensing, LLC	Active
257013-US-7	US	8/3/2016	US15/227439	US9742345	8/22/2017	System and method for fault protection of a motor	Dolby Intellectual Property Licensing, LLC	Active
257035-US-1	US	3/8/2012	US13/414800	US9120390	9/1/2015	Apparatus for transferring energy using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
257085-JP-3	JP	5/17/2013	JP2013104607A	JP6196805	9/13/2017	Energy storage device and energy storage method	Dolby Intellectual Property Licensing, LLC	Active
257085-US-2	US	12/3/2012	US13/692087	US9005793	4/14/2015	Energy storage article and method	Dolby Intellectual Property Licensing, LLC	Active
257472-US-2	US	11/15/2012	US13/677613	US8949163	2/3/2015	Adoption simulation with evidential reasoning using agent models in a hierarchical structure	Dolby Intellectual Property Licensing, LLC	Active
257527-CN-2	CN	5/17/2013	CN201310182840A	CN103427680	3/27/2018	Transformer tapping translation circuit and preparation method thereof	Dolby Intellectual Property Licensing, LLC	Active
257527-JP-3	JP	5/14/2013	JP2013101771A	JP6259202	1/10/2018	Transformer tap switching circuit and method for making the same	Dolby Intellectual Property Licensing, LLC	Active
257527-US-1	US	5/18/2012	US13/475186	US9025352	5/5/2015	Transformer tap-changing circuit and method of making same	Dolby Intellectual Property Licensing, LLC	Active
257939-US-1	US	7/24/2012	US13/556525	US9933488	4/3/2018	Open circuit voltage checking for a battery system	Dolby Intellectual Property Licensing, LLC	Active
257940-US-1	US	7/25/2012	US13/557676	US9148025	9/29/2015	System and method for a rechargeable battery	Dolby Intellectual Property Licensing, LLC	Active
259209-US-1	US	4/26/2012	US13/456399	US8842881	9/23/2014	Real-time video tracking system	Dolby Intellectual Property Licensing, LLC	Active
259209-US-2	US	9/22/2014	US14/493044	US9626581	4/18/2017	Real-time video tracking system	Dolby Intellectual Property Licensing, LLC	Active
259236-CA-10	CA	9/12/2013	CA2884670A	CA2884670	7/14/2020	System and method for generating an activity summary of a person	Dolby Intellectual Property Licensing, LLC	Active
259236-JP-9	JP	9/12/2013	JP2015532045A	JP6307083	4/4/2018	System and method for generating a human behavior summary	Dolby Intellectual Property Licensing, LLC	Active
259236-KR-8	KR	9/12/2013	KR20157009311A	KR102189205	12/10/2020	System and method for generating an activity summary of a person	Dolby Intellectual Property Licensing, LLC	Active
259236-US-2	US	5/7/2013	US13/888941	US10271017	4/23/2019	System and method for generating an activity summary of a person	Dolby Intellectual Property Licensing, LLC	Active
259276-CN-2	CN	5/21/2013	CN201310189269A	CN103419669	4/12/2017	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-CN-5	CN	5/21/2013	CN201611216567A	CN106926718	3/20/2020	Method and apparatus for charging a plurality of energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-JP-3	JP	5/17/2013	JP2013104614A	JP6557445	8/7/2019	Method and apparatus for charging a plurality of energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-1	US	5/21/2012	US13/476165	US8981727	3/17/2015	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-10	US	2/3/2022	US17/592062	US11697352	7/11/2023	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-4	US	3/13/2015	US14/656782	US9821668	11/21/2017	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-6	US	9/22/2017	US15/712904	US10081257	9/25/2018	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active

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259276-US-7	US	9/25/2017	US15/713905	US10081258	9/25/2018	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-8	US	8/17/2018	US16/104445	US10766372	9/8/2020	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259276-US-9	US	12/20/2019	US16/723171	US11318852	5/3/2022	Method and apparatus for charging multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
259278-BR-6	BR	5/10/2013	BR102013011666A	BR102013011666	12/29/2020	Contactor unit, method for operating an isolating contactor and system for isolating a first voltage device from a second voltage device	Dolby Intellectual Property Licensing, LLC	Active
259278-CN-4	CN	5/21/2013	CN201310189949A	CN103419615	7/7/2017	Contactor partition method and equipment	Dolby Intellectual Property Licensing, LLC	Active
259278-DE-7	DE	5/16/2013	EP13168098A	EP2667396	1/6/2016	Contactor isolation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259278-FR-8	FR	5/16/2013	EP13168098A	EP2667396	1/6/2016	Contactor isolation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259278-GB-9	GB	5/16/2013	EP13168098A	EP2667396	1/6/2016	Contactor isolation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259278-IN-5	IN	4/23/2013	IN1188DE2013A	IN328615	1/3/2020	Contactor isolation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259278-JP-2	JP	5/16/2013	JP2013103607A	JP6362832	7/25/2018	Contactor insulation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259278-US-1	US	5/21/2012	US13/476188	US9142372	9/22/2015	Contactor isolation method and apparatus	Dolby Intellectual Property Licensing, LLC	Active
259306-US-1	US	11/30/2012	US13/689819	US9040019	5/26/2015	Methods of detecting myelin basic protein	Dolby Intellectual Property Licensing, LLC	Active
259392-US-1	US	4/13/2012	US13/446714	US8732456	5/20/2014	Enterprise environment disk encryption	Dolby Intellectual Property Licensing, LLC	Active
259422-BR-6	BR	6/6/2013	BR102013014032A	BR102013014032	4/26/2022	Electric drive device	Dolby Intellectual Property Licensing, LLC	Active
259422-CN-4	CN	6/7/2013	CN201310224017A	CN103490460	7/11/2017	For transmitting the system of the energy from the energy and manufacturing its method	Dolby Intellectual Property Licensing, LLC	Active
259422-EP-3	EP	6/6/2013	EP13170766A	EP2672600	12/11/2013	System for transferring energy from an energy source and method of making same	Dolby Intellectual Property Licensing, LLC	Active
259422-JP-2	JP	6/4/2013	JP2013117431A	JP6659203	3/4/2020	System for transferring energy from an energy source and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
259422-US-1	US	6/7/2012	US13/490505	US9013168	4/21/2015	System for transferring energy from an energy source and method of making same	Dolby Intellectual Property Licensing, LLC	Active
260380-CN-1	CN	9/28/2012	CN201210370943A	CN103707748	3/1/2017	Power transmission system and drive system	Dolby Intellectual Property Licensing, LLC	Active
260416-CN-5	CN	10/11/2013	CN201380006738IA	CN105143818	7/3/2018	Digital feeler gauge and its application method	Dolby Intellectual Property Licensing, LLC	Active
260416-DE-10	DE	10/11/2013	EP13783176A	EP2909578	12/18/2019	Digital feeler gauge	Dolby Intellectual Property Licensing, LLC	Active
260416-EP-7	EP	10/11/2013	EP13783176A	EP2909578	12/18/2019	Digital feeler gauge	Dolby Intellectual Property Licensing, LLC	Active
260416-FR-9	FR	10/11/2013	EP13783176A	EP2909578	12/18/2019	Digital feeler gauge	Dolby Intellectual Property Licensing, LLC	Active
260416-GB-11	GB	10/11/2013	EP13783176A	EP2909578	12/18/2019	Digital feeler gauge	Dolby Intellectual Property Licensing, LLC	Active

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260416-IN-6	IN	4/22/2015	IN2287CHN2015A	IN403125	8/12/2022	Digital feeler gauge and method of using same	Dolby Intellectual Property Licensing, LLC	Active
260416-JP-4	JP	10/11/2013	JP2015537745A	JP6329555	5/23/2018	Digital gap gauge and how to use it	Dolby Intellectual Property Licensing, LLC	Active
260416-KR-8	KR	10/11/2013	KR20157013053A	KR101912000	10/25/2018	Digital feeler gauge and method of using same	Dolby Intellectual Property Licensing, LLC	Active
260416-US-2	US	12/31/2012	US13/731929	US8919004	12/30/2014	Digital feeler gauge and method of using same	Dolby Intellectual Property Licensing, LLC	Active
260496-US-1	US	7/31/2012	US13/563111	US8962191	2/24/2015	Electrochemical cells having a electrode current collector extending into a positive electrode composition, and related methods	Dolby Intellectual Property Licensing, LLC	Active
260661-CN-2	CN	8/29/2013	CN201310383553A	CN103683524	10/17/2017	The contactless system of power transmission	Dolby Intellectual Property Licensing, LLC	Active
260661-DE-3	DE	8/29/2013	DE102013109382A	DE102013109382	3/13/2014	Non-contact energy transmission system	Dolby Intellectual Property Licensing, LLC	Active
260661-IN-1	IN	8/29/2012	IN3574CH2012A	IN346978	9/25/2020	Contactless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
260661-US-4	US	8/28/2013	US14/012245	US9697951	7/4/2017	Contactless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
260661-US-5	US	6/2/2017	US15/612324	US10490345	11/26/2019	Contactless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
260807-US-1	US	8/30/2012	US13/599469	US8988047	3/24/2015	Method of charging an electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
261519-CN-3	CN	11/13/2013	CN201310571078A	CN103928661	5/8/2018	Composition, energy storage device and relevant method	Dolby Intellectual Property Licensing, LLC	Active
261519-JP-4	JP	11/11/2013	JP2013232640A	JP6470901	2/13/2019	Composition, energy storage device and related processes	Dolby Intellectual Property Licensing, LLC	Active
261519-US-1	US	11/13/2012	US13/675061	US9257698	2/9/2016	Composition, energy storage device, and related process	Dolby Intellectual Property Licensing, LLC	Active
261528-BR-3	BR	9/23/2013	BR102013024325A	BR102013024325	4/26/2022	Power conversion system	Dolby Intellectual Property Licensing, LLC	Active
261528-CN-1	CN	9/24/2012	CN201210359161A	CN103684002	12/21/2016	Energy conversion system	Dolby Intellectual Property Licensing, LLC	Active
261528-IN-4	IN	9/16/2013	IN4150CH2013A	IN404705	9/2/2022	Power conversion system	Dolby Intellectual Property Licensing, LLC	Active
261528-JP-5	JP	9/17/2013	JP2013191274A	JP6496475	4/3/2019	Power conversion system	Dolby Intellectual Property Licensing, LLC	Active
261528-US-2	US	9/19/2013	US14/031778	US9537423	1/3/2017	Power conversion system	Dolby Intellectual Property Licensing, LLC	Active
261543-US-1	US	11/30/2012	US13/690644	US9368840	6/14/2016	Method for maintaining the performance level of an electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
261715-US-1	US	12/13/2012	US13/713745	US8977331	3/10/2015	Systems and methods for nerve imaging	Dolby Intellectual Property Licensing, LLC	Active
261939-US-1	US	12/28/2012	US13/729134	US9105896	8/11/2015	Metal rings for active brazing in sodium-based thermal batteries	Dolby Intellectual Property Licensing, LLC	Active
261949-US-1	US	12/26/2012	US13/726846	US9012060	4/21/2015	System and method for battery insulation	Dolby Intellectual Property Licensing, LLC	Active
262057-BR-2	BR	9/9/2013	BR102013023000A	BR102013023000	6/8/2021	Electric power supply apparatus	Dolby Intellectual Property Licensing, LLC	Active

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262057-EP-3	EP	9/24/2013	EP13185678A	EP2711233	3/26/2014	Power supply management apparatus and method thereof	Dolby Intellectual Property Licensing, LLC	Active
262057-IN-4	IN	8/27/2013	IN3793CH2013A	IN404774	9/2/2022	Power supply management apparatus and method thereof	Dolby Intellectual Property Licensing, LLC	Active
262057-JP-5	JP	9/20/2013	JP2013194766A	JP6881883	6/2/2021	A vehicle provided with an electric power supply control apparatus and an electric power supply control apparatus	Dolby Intellectual Property Licensing, LLC	Active
262057-US-6	US	9/17/2013	US14/028565	US10363823	7/30/2019	Power supply management apparatus and method thereof	Dolby Intellectual Property Licensing, LLC	Active
262057-US-7	US	6/12/2019	US16/439199	US11225150	1/18/2022	Power supply management apparatus and method thereof	Dolby Intellectual Property Licensing, LLC	Active
262115-AU-6	AU	8/1/2014	AU2014208262A	AU2014208262	9/12/2019	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-BR-4	BR	7/31/2014	BR102014018911A	BR102014018911	10/27/2020	Image capture device and method for acquiring images of an object by means of an image capture device	Dolby Intellectual Property Licensing, LLC	Active
262115-CA-5	CA	7/24/2014	CA2857714A	CA2857714	1/19/2021	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-CN-3	CN	8/8/2014	CN201410388243A	CN104570382	11/5/2019	The device and method of optical image super-resolution are shifted using integral	Dolby Intellectual Property Licensing, LLC	Active
262115-DE-8	DE	8/1/2014	EP14179557A	EP2860574	9/30/2020	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-EP-2	EP	8/1/2014	EP14179557A	EP2860574	9/30/2020	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-FR-7	FR	8/1/2014	EP14179557A	EP2860574	9/30/2020	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-GB-9	GB	8/1/2014	EP14179557A	EP2860574	9/30/2020	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262115-US-1	US	10/9/2013	US14/049368	US9025067	5/5/2015	Apparatus and method for image super-resolution using integral shifting optics	Dolby Intellectual Property Licensing, LLC	Active
262665-US-1	US	6/22/2012	US13/530577	US9471515	10/18/2016	Systems, methods, and apparatus for medical device interface connectivity	Dolby Intellectual Property Licensing, LLC	Active
263576-CN-1	CN	3/29/2013	CN201310109147A	CN104079194	3/1/2017	Electric energy conversion system and method	Dolby Intellectual Property Licensing, LLC	Active
263939-US-3	US	10/29/2013	US14/066166	US9303549	4/5/2016	Engine cooling system and method for an engine	Dolby Intellectual Property Licensing, LLC	Active
264142-CN-1	CN	5/7/2013	CN201310164748A	CN104143832	8/24/2016	For collapse of voltage condition detection and the system and method for control	Dolby Intellectual Property Licensing, LLC	Active
264203-CN-1	CN	3/15/2013	CN201310084413A	CN104044484	3/27/2018	Drive system and driving method	Dolby Intellectual Property Licensing, LLC	Active
264203-DE-7	DE	3/14/2014	EP14160034A	EP2779413	7/7/2021	Drive system and method for driving a vehicle	Dolby Intellectual Property Licensing, LLC	Active
264203-EP-4	EP	3/14/2014	EP14160034A	EP2779413	7/7/2021	Drive system and method for driving a vehicle	Dolby Intellectual Property Licensing, LLC	Active
264203-JP-3	JP	3/14/2014	JP2014051022A	JP6548318	7/24/2019	Drive system and method for driving a vehicle	Dolby Intellectual Property Licensing, LLC	Active
264291-AU-4	AU	9/12/2013	AU2013315478A	AU2013315478	11/15/2018	System and method for generating semantic annotations	Dolby Intellectual Property Licensing, LLC	Active

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264291-CA-6	CA	9/12/2013	CA2884714A	CA2884714	5/22/2018	System and method for generating semantic annotations	Dolby Intellectual Property Licensing, LLC	Active
264291-CN-7	CN	9/12/2013	CN201380059257A	CN104781831	4/30/2019	System and method for generative semantics mark	Dolby Intellectual Property Licensing, LLC	Active
264291-JP-9	JP	9/12/2013	JP2015532040A	JP6307082	4/4/2018	System and method for generating semantic annotations	Dolby Intellectual Property Licensing, LLC	Active
264291-KR-10	KR	9/12/2013	KR20157008904747A	KR101890467	8/21/2018	System and method for generating semantic annotations	Dolby Intellectual Property Licensing, LLC	Active
264291-US-2	US	6/15/2013	US13/918905	US9251421	2/2/2016	System and methnd for generating semantic annotations	Dolby Intellectual Property Licensing, LLC	Active
264323A-US-1	US	11/2/2013	US14/070511	US9360528	6/7/2016	Method and system for voltage sense input	Dolby Intellectual Property Licensing, LLC	Active
264323-US-2	US	11/2/2013	US14/070505	US10060984	8/28/2018	Battery management systems and methods	Dolby Intellectual Property Licensing, LLC	Active
264353-US-1	US	12/7/2012	US13/708107	US8889241	11/18/2014	Stacked film reflective layers for multi-layer optical data storage	Dolby Intellectual Property Licensing, LLC	Active
264353-US-4	US	11/17/2014	US14/543438	US9099104	8/4/2015	Stacked film reflective layers for multi-layer optical data storage	Dolby Intellectual Property Licensing, LLC	Active
264428-BR-6	BR	3/14/2014	BR102014006100A	BR102014006100	7/5/2016	Appliance and vehicle	Dolby Intellectual Property Licensing, LLC	Active
264428-CN-1	CN	3/15/2013	CN201310084090A	CN104044475	7/11/2017	Improved drive system and the device using the drive system	Dolby Intellectual Property Licensing, LLC	Active
264428-DE-7	DE	3/14/2014	EP14160004A	EP2777974	2/27/2019	Electric vehicle with improved electric drive system	Dolby Intellectual Property Licensing, LLC	Active
264428-EP-4	EP	3/14/2014	EP14160004A	EP2777974	2/27/2019	Electric vehicle with improved electric drive system	Dolby Intellectual Property Licensing, LLC	Active
264428-IN-5	IN	3/12/2014	IN1284CH2014A	IN378944	10/15/2021	Electric vehicle with improved electric drive system	Dolby Intellectual Property Licensing, LLC	Active
264428-JP-3	JP	3/12/2014	JP2014048291A	JP6352655	7/4/2018	Electric vehicle with improved electric drive system	Dolby Intellectual Property Licensing, LLC	Active
264428-US-2	US	3/10/2014	US14/202506	US9780702	10/3/2017	Electric vehicle with improved electric drive system	Dolby Intellectual Property Licensing, LLC	Active
264800-US-1	US	6/6/2013	US13/912050	US9078862	7/14/2015	Platelet activation using long electric field pulses	Dolby Intellectual Property Licensing, LLC	Active
264801-US-1	US	6/6/2013	US13/911987	US9238808	1/19/2016	Modular adjustable pulse generator	Dolby Intellectual Property Licensing, LLC	Active
264901-US-1	US	12/26/2012	US13/727019	US9465080	10/11/2016	System and method for prognosis of batteries	Dolby Intellectual Property Licensing, LLC	Active
265319-CN-4	CN	11/20/2014	CN201410670323A	CN104659895	11/15/2019	For using the equipment and its manufacturing method of vehicle power electronic device quick charge	Dolby Intellectual Property Licensing, LLC	Active
265319-DE-6	DE	11/19/2014	EP14193904A	EP2875984	8/2/2023	Apparatus for rapid charging using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
265319-EP-3	EP	11/19/2014	EP14193904A	EP2875984	8/2/2023	Apparatus for rapid charging using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
265319-IN-5	IN	7/23/2014	IN5693CHN2014A	IN304209	12/14/2018	A method and a system for monitoring and control of	Dolby Intellectual Property Licensing, LLC	Active
265319-JP-2	JP	11/17/2014	JP2014232280A	JP6467198	2/6/2019	Device for rapid charging using in-vehicle power electronics and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active

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265319-US-1	US	11/20/2013	US14/085313	US9238415	1/19/2016	Apparatus for rapid charging using onboard power electronics and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
265379-US-1	US	7/31/2013	US13/955413	US9692045	6/27/2017	Porous absorbent for sodium metal halide cells	Dolby Intellectual Property Licensing, LLC	Active
265379-US-2	US	7/31/2013	US13/955476	US10033069	7/24/2018	Porous absorbent for sodium metal halide cells	Dolby Intellectual Property Licensing, LLC	Active
265452-US-1	US	6/26/2013	US13/927543	US8912512	12/16/2014	System and method for optical biopsy tissue characterization	Joint ownership - Dolby Intellectual Property Licensing, LLC and Memorial Sloan Kettering Cancer Center	Active
265784-BR-4	BR	8/4/2014	BR102014019219A	BR102014019219	8/10/2021	Internal permanent magnet machine and method for arranging together an internal permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
265784-CN-3	CN	8/5/2014	CN201410616305A	CN104393730	1/18/2019	Spoke permanent magnetic motor and its manufacturing method with reduced torque ripple	Dolby Intellectual Property Licensing, LLC	Active
265784-DE-9	DE	7/31/2014	EP14179274A	EP2840692	12/23/2020	Spoke pennanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-EP-2	EP	7/31/2014	EP14179274A	EP2840692	12/23/2020	Spoke permanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-FR-8	FR	7/31/2014	EP14179274A	EP2840692	12/23/2020	Spoke permanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-GB-11	GB	7/31/2014	EP14179274A	EP2840692	12/23/2020	Spoke permanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-KR-6	KR	8/4/2014	KR20140099747A	KR101911978	10/25/2018	Spoke pennanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-NL-10	NL	7/31/2014	EP14179274A	EP2840692	12/23/2020	Spoke permanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265784-US-1	US	8/5/2013	US13/958693	US9287742	3/15/2016	Spoke permanent magnet machine with reduced torque ripple and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
265951-CN-5	CN	10/26/2015	CN201580065801A	CN107004541	12/17/2019	Multi-channel relay assembly with in-line mems switches	Dolby Intellectual Property Licensing, LLC	Active
265951-EP-6	EP	10/26/2015	EP15791159A	EP3227899	10/11/2017	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
265951-KR-10	KR	10/26/2015	KR20237015032A	KR20230065386	5/11/2023	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
265951-SG-9	SG	10/26/2015	SG11201704153RA	SG11201704153R	6/29/2017	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
265951-TW-3	TW	11/19/2015	TW104138310A	TWI695398	6/1/2020	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
265951-US-1	US	12/3/2014	US14/558990	US9362608	6/7/2016	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
266269-BR-2	BR	10/17/2014	BR102014025977A	BR102014025977	8/3/2021	Electric machine and vehicle	Dolby Intellectual Property Licensing, LLC	Active
266269-KR-6	KR	10/17/2014	KR20140140921A	KR101996687	7/4/2019	Torque ripple reduction in electric machines	Dolby Intellectual Property Licensing, LLC	Active
266269-US-1	US	10/18/2013	US14/057591	US9742228	8/22/2017	Torque ripple reduction in electric machines	Dolby Intellectual Property Licensing, LLC	Active
266271-CN-2	CN	11/5/2014	CN201410615389A	CN104618320	7/9/2019	System and method for implementation of file transfer	Dolby Intellectual Property Licensing, LLC	Active

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266271-DE-5	DE	11/3/2014	EP14191515A	EP2869529	8/31/2016	Systems and methods for secure file transfers	Dolby Intellectual Property Licensing, LLC	Active
266271-FR-6	FR	11/3/2014	EP14191515A	EP2869529	8/31/2016	Systems and methods for secure file transfers	Dolby Intellectual Property Licensing, LLC	Active
266271-GB-7	GB	11/3/2014	EP14191515A	EP2869529	8/31/2016	Systems and methods for secure file transfers	Dolby Intellectual Property Licensing, LLC	Active
266271-JP-4	JP	10/29/2014	JP2014219873A	JP6496522	4/3/2019	System and method for secure file transfer	Dolby Intellectual Property Licensing, LLC	Active
266271-US-1	US	11/5/2013	US14/072425	US9306915	4/5/2016	Systems and methods for secure file transfers	Dolby Intellectual Property Licensing, LLC	Active
266953-CN-1	CN	8/1/2013	CN201310331899A	CN104348199	3/1/2017	Battery management system and method	Dolby Intellectual Property Licensing, LLC	Active
266953-JP-3	JP	7/25/2014	JP2014151392A	JP6356518	7/11/2018	Battery management system and method	Dolby Intellectual Property Licensing, LLC	Active
266953-US-2	US	7/2/2014	US14/321935	US9455580	9/27/2016	Battery management system and method	Dolby Intellectual Property Licensing, LLC	Active
266980-US-1	US	12/28/2012	US13/729343	US9028997	5/12/2015	Ceramic collars for active brazing in sodium-based thermal batteries	Dolby Intellectual Property Licensing, LLC	Active
267009-US-1	US	9/27/2013	US14/039497	US9999352	6/19/2018	System and method for determining a hydration level of a tissue region	Dolby Intellectual Property Licensing, LLC	Active
267101-CN-4	CN	11/5/2014	CN201410858234A	CN104618341	12/27/2019	System and method for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-DE-6	DE	11/5/2014	EP14191891A	EP2869530	5/4/2022	Systems and methods for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-FP-2	FP	11/5/2014	EP14191891A	EP2869530	5/4/2022	Systems and methods for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-FR-5	FR	11/5/2014	EP14191891A	EP2869530	5/4/2022	Systems and methods for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-GB-7	GB	11/5/2014	EP14191891A	EP2869530	5/4/2022	Systems and methods for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-JP-3	JP	10/29/2014	JP2014219874A	JP6416585	10/31/2018	System and method for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267101-US-1	US	11/5/2013	US14/072414	US9191368	11/17/2015	Systems and methods for secure remote access	Dolby Intellectual Property Licensing, LLC	Active
267351-CA-2	CA	7/10/2014	CA2856487A	CA2856487	11/16/2021	Systems and methods for data loss prevention	Dolby Intellectual Property Licensing, LLC	Active
267351-JP-4	JP	7/11/2014	JP2014143007A	JP6587790	10/9/2019	System and method for data loss prevention	Dolby Intellectual Property Licensing, LLC	Active
267351-US-1	US	7/15/2013	US13/942318	US10346616	7/9/2019	Systems and methods for data loss prevention	Dolby Intellectual Property Licensing, LLC	Active
267632-US-1	US	4/25/2014	US14/262144	US9748767	8/29/2017	System and method for hybrid energy conversion	Dolby Intellectual Property Licensing, LLC	Active
267632-US-2	US	8/10/2017	US15/673520	US10431978	10/1/2019	System and method for hybrid energy conversion	Dolby Intellectual Property Licensing, LLC	Active
267788-CN-1	CN	10/11/2013	CN201310472988A	CN104553838	3/1/2017	Propulsion system	Dolby Intellectual Property Licensing, LLC	Active
267788-JP-3	JP	10/10/2014	JP2014208468A	JP6749742	9/2/2020	Propulsion system and vehicle driving method	Dolby Intellectual Property Licensing, LLC	Active

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267788-US-2	US	10/10/2014	US14/511362	US9895983	2/20/2018	Propulsion system and method for driving a vehicle	Dolby Intellectual Property Licensing, LLC	Active
267819-CN-4	CN	7/24/2014	CN201410354403A	CN104348269	4/2/2019	System and method for the field spider in equating motor	Dolby Intellectual Property Licensing, LLC	Active
267819-DE-6	DE	7/17/2014	EP14177512A	EP2840678	7/7/2021	System and method for smoothing a salient rotor in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
267819-EP-3	EP	7/17/2014	EP14177512A	EP2840678	7/7/2021	System and method for smoothing a salient rotor in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
267819-JP-2	JP	7/18/2014	JP2014147258A	JP6475431	2/27/2019	System and method for smoothing a protruding rotor of an electric machine	Dolby Intellectual Property Licensing, LLC	Active
267819-US-1	US	7/24/2013	US13/949406	US9520751	12/13/2016	System and method for smoothing a salient rotor in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
267847-CA-3	CA	7/18/2014	CA2857244A	CA2857244	8/15/2017	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267847-CN-4	CN	7/24/2014	CN201410354637A	CN104348221	6/13/2017	Isolation battery management system and its method	Dolby Intellectual Property Licensing, LLC	Active
267847-DE-6	DE	7/21/2014	EP14177828A	EP2830182	9/6/2017	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267847-FR-8	FR	7/21/2014	EP14177828A	EP2830182	9/6/2017	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267847-GB-9	GB	7/21/2014	EP14177828A	EP2830182	9/6/2017	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267847-IT-7	IT	7/21/2014	EP14177828A	EP2830182	9/6/2017	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267847-JP-5	JP	7/22/2014	JP2014148432A	JP5890868	3/22/2016	Insulated battery management system and method	Dolby Intellectual Property Licensing, LLC	Active
267847-US-1	US	7/24/2013	US13/949567	US9318893	4/19/2016	Isolated battery management systems and methods thereof	Dolby Intellectual Property Licensing, LLC	Active
267895-CN-1	CN	1/27/2014	CN201410038726A	CN104811064	7/3/2020	Energy conversion system, photovoltaic energy conversion system and method	Dolby Intellectual Property Licensing, LLC	Active
268047-JP-3	JP	8/13/2014	JP2014164626A	JP6636238	1/29/2020	Plasmon interface and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
268047-TW-4	TW	8/7/2014	TW103127087A	TWI657278	4/21/2019	Plasmonic interface and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
268047-US-1	US	8/20/2013	US13/970852	US9465160	10/11/2016	Plasmonic interface and method of manufacturing thereof	Dolby Intellectual Property Licensing, LLC	Active
268102-DE-6	DE	7/23/2014	EP14178108A	EP2830186	12/6/2017	Battery heater systems and methods	Dolby Intellectual Property Licensing, LLC	Active
268102-FR-7	FR	7/23/2014	EP14178108A	EP2830186	12/6/2017	Battery heater systems and methods	Dolby Intellectual Property Licensing, LLC	Active
268102-GB-8	GB	7/23/2014	EP14178108A	EP2830186	12/6/2017	Battery heater systems and methods	Dolby Intellectual Property Licensing, LLC	Active
268102-IT-9	IT	7/23/2014	EP14178108A	EP2830186	12/6/2017	Battery heater systems and methods	Dolby Intellectual Property Licensing, LLC	Active
268102-KR-5	KR	7/25/2014	KR20140094717A	KR102219244	2/23/2021	Battery heater systems and methods	Dolby Intellectual Property Licensing, LLC	Active
268134-US-1	US	2/14/2013	US13/767066	US9028998	5/12/2015	Battery cell design and method of cooling battery cells	Dolby Intellectual Property Licensing, LLC	Active

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268409-US-1	US	10/16/2013	US14/055024	US9685904	6/20/2017	Photovoltaic system with improved dc connections and method of making same	Dolby Intellectual Property Licensing, LLC	Active
268409-US-2	US	10/16/2013	US14/055042	US9893678	2/13/2018	Photovoltaic system with improved ac connections and method of making same	Dolby Intellectual Property Licensing, LLC	Active
268409-US-3	US	5/24/2017	US15/604066	US10812015	10/20/2020	Micro-inverter assembly for use in a photovoltaic system and method of making same	Dolby Intellectual Property Licensing, LLC	Active
269204-CN-1	CN	10/25/2013	CN201310512240A	CN104554074	9/15/2017	Vehicle control system	Dolby Intellectual Property Licensing, LLC	Active
269204-JP-3	JP	10/21/2014	JP2014214125A	JP6496518	4/3/2019	Vehicle control system	Dolby Intellectual Property Licensing, LLC	Active
269204-US-2	US	10/15/2014	US14/514957	US9517696	12/13/2016	Vehicle control system	Dolby Intellectual Property Licensing, LLC	Active
269205-CN-1	CN	9/18/2013	CN201310429818A	CN104442412	1/19/2018	Device, mobile transporting equipment, electric tractor, electri forklift and associated method	Dolby Intellectual Property Licensing, LLC	Active
269205-DE-6	DE	9/17/2014	EP14185231A	EP2853459	6/17/2020	Apparatus, vehicle, and method for operating vehicle	Dolby Intellectual Property Licensing, LLC	Active
269205-EP-5	EP	9/17/2014	EP14185231A	EP2853459	6/17/2020	Apparatus, vehicle, and method for operating vehicle	Dolby Intellectual Property Licensing, LLC	Active
269205-IN-4	IN	9/17/2014	IN4524CH2014A	IN437465	7/7/2023	Apparatus, vehicle and method for operating vehicle	Dolby Intellectual Property Licensing, LLC	Active
269545-DE-9	DE	9/4/2014	EP14772495A	EP3055976	2/6/2019	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-EP-4	EP	9/4/2014	EP14772495A	EP3055976	2/6/2019	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-FR-8	FR	9/4/2014	EP14772495A	EP3055976	2/6/2019	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-GB-10	GB	9/4/2014	EP14772495A	EP3055976	2/6/2019	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-KR-6	KR	9/4/2014	KR20167011606A	KR101984363	5/30/2019	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-TW-3	TW	9/25/2014	TW103133301A	TWI664588	7/1/2019	Systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269545-US-1	US	10/8/2013	US14/048930	US9870690	1/16/2018	Methods and systems for a universal wireless platform for asset monitoring	Dolby Intellectual Property Licensing, LLC	Active
269575-AU-21	AU	7/22/2020	AU2020207831A	AU2020207831	1/13/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-AU-4	AU	1/9/2015	AU2015206756A	AU2015206756	5/14/2020	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-BR-5	BR	1/9/2015	112016014953-0	N/A	9/12/2023		Dolby Intellectual Property Licensing, LLC	Active
269575-CA-6	CA	1/9/2015	CA2936230A	CA2936230	6/14/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-CN-7	CN	1/9/2015	CN201580004722A	CN105899949	9/3/2019	Use the platelet activation and growth factor release of electric pulse	Dolby Intellectual Property Licensing, LLC	Active
269575-DE-18	DE	1/9/2015	EP15701451A	EP3094970	3/6/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-DE-23	DE	1/9/2015	EP18210634A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active

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269575-EP-16	EP	1/9/2015	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-EP-8	EP	1/9/2015	EP15701451A	EP3094970	3/6/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-ES-25	ES	1/9/2015	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-FR-17	FR	1/9/2015	EP15701451A	EP3094970	3/6/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-FR-22	FR	1/9/2015	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-GB-19	GB	1/9/2015	EP15701451A	EP3094970	3/6/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-GB-26	GB	1/9/2015	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-IN-9	IN	7/19/2016	IN201647024905A	IN412195	11/25/2022	Platelet activation and growth factor release using	Dolby Intellectual Property Licensing, LLC	Active
269575-IT-24	IT	1/9/2015	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-JP-10	JP	1/9/2015	JP2016545972A	JP6625542	12/25/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-KR-11	KR	1/9/2015	KR20167021523A	KR10227793 1	7/15/2021	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-MX-12	MX	1/9/2015	MX2016009316A	MX2016009316	10/13/2016	Platelet activation and growth factor release using electric pulses.	Dolby Intellectual Property Licensing, LLC	Active
269575-RU-13	RU	1/9/2015	RU2016126427A	RU2712234	1/27/2020	Thrombocyte activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-TW-3	TW	1/7/2015	TW104100402A	TWI673054	10/1/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-US-1	US	1/17/2014	US14/157819	US9452199	9/27/2016	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-US-14	US	8/30/2016	US15/252032	US10369200	8/6/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-US-15	US	8/30/2016	US15/251990	US10383915	8/20/2019	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-US-20	US	7/17/2019	US16/514662	US11464829	10/11/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269575-US-27	US	9/28/2022	US17/936162	US12042526	7/23/2024	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active
269603-AU-12	AU	11/20/2014	AU2014377586A	AU2014377586	5/28/2020	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603A-US-1	US	4/17/2018	US15/955377	US10421956	9/24/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603A-US-2	US	8/12/2019	US16/538616	US11525768	12/13/2022	Electric pulse generation system using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-BR-7	BR	11/20/2014	BR112016015394A	BR112016015394	1/12/2021	Electric pulse generation system	Dolby Intellectual Property Licensing, LLC	Active
269603-CA-6	CA	11/20/2014	CA2936197A	CA2936197	4/25/2023	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active

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269603-CN-19	CN	11/20/2014	CN202110196663A	CN113088444	7/9/2021	Electric pulse generating system using capacitance coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-DE-16	DE	11/20/2014	EP14815988A	EP3094969	9/11/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-EP-4	EP	11/20/2014	EP14815988A	EP3094969	9/11/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-FR-15	FR	11/20/2014	EP14815988A	EP3094969	9/11/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-GB-17	GB	11/20/2014	EP14815988A	EP3094969	9/11/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-IN-11	IN	7/15/2016	IN201647024253A	IN424532	3/10/2023	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-JP-9	JP	11/20/2014	JP2016544865A	JP6573617	9/11/2019	Electric pulse generation system using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-KR-13	KR	11/20/2014	KR20167021404A	KR10221373 1	2/8/2021	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-KR-18	KR	11/20/2014	KR20217002961A	KR10225595 1	5/25/2021	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-MX-8	MX	11/20/2014	MX2016009314A	MX2016009 314	10/13/2016	Electric pulse generation systems using capacitive coupling.	Dolby Intellectual Property Licensing, LLC	Active
269603-RU-5	RU	11/20/2014	RU2016127559A	RU2709822	12/23/2019	Electrical pulses generation system using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-TW-3	TW	12/26/2014	TW103145805A	TWI673033	10/1/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-US-1	US	1/17/2014	US14/158106	US9708597	7/18/2017	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-US-14	US	7/17/2017	US15/651900	US10329551	6/25/2019	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269676-BR-6	BR	10/8/2014	BR102014025123A	BR10201402 5123	7/13/2021	Ferrite permanent magnet electric machine, method for heating a permanent magnet magnet electric machine and permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
269676-CN-3	CN	10/24/2014	CN201410573904A	CN10457865 1	9/21/2018	For the system and method for low-temperature heat ferrite magnet motor	Dolby Intellectual Property Licensing, LLC	Active
269676-DE-9	DE	10/24/2014	EP14190298A	EP2866334	10/24/2018	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-EP-2	EP	10/24/2014	EP14190298A	EP2866334	10/24/2018	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-FR-8	FR	10/24/2014	EP14190298A	EP2866334	10/24/2018	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-GB-10	GB	10/24/2014	EP14190298A	EP2866334	10/24/2018	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-JP-5	JP	10/21/2014	JP2014214126A	JP6541145	7/10/2019	System and method for heating a low temperature ferrite magnet motor	Dolby Intellectual Property Licensing, LLC	Active
269676-KR-4	KR	10/24/2014	KR20140145400A	KR10230251 3	9/17/2021	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-US-1	US	10/25/2013	US14/063547	US9698660	7/4/2017	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active
269676-US-7	US	5/5/2017	US15/588044	US9966897	5/8/2018	System and method for heating ferrite magnet motors for low temperatures	Dolby Intellectual Property Licensing, LLC	Active

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269695-CN-5	CN	10/8/2014	CN201410525151A	CN104517178	12/20/2022	Method and system for dynamic workflow priority determination and task allocation	Dolby Intellectual Property Licensing, LLC	Active
269695-DE-7	DE	10/1/2014	EP14187291A	EP2860987	9/30/2020	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-EP-2	EP	10/1/2014	EP14187291A	EP2860987	9/30/2020	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-FR-6	FR	10/1/2014	EP14187291A	EP2860987	9/30/2020	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-GB-8	GB	10/1/2014	EP14187291A	EP2860987	9/30/2020	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-JP-3	JP	10/3/2014	JP2014204374A	JP6467181	2/6/2019	Method and system for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-KR-4	KR	10/7/2014	KR20140134902A	KR102238059	4/8/2021	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269695-US-1	US	10/8/2013	US14/048934	US10437203	10/8/2019	Methods and systems for dynamic workflow prioritization and tasking	Dolby Intellectual Property Licensing, LLC	Active
269823-CN-3	CN	8/28/2015	CN201510765021A	CN105391372	8/18/2020	Magnet management in an electric machine	Dolby Intellectual Property Licensing, LLC	Active
269823-DE-6	DE	8/27/2015	EP15182787A	EP2991220	10/12/2022	Magnet management in electric machines	Dolby Intellectual Property Licensing, LLC	Active
269823-EP-2	EP	8/27/2015	EP15182787A	EP2991220	10/12/2022	Magnet management in electric machines	Dolby Intellectual Property Licensing, LLC	Active
269823-JP-4	JP	8/26/2015	JP2015166313A	JP7130351	9/5/2022	Magnet management in electric machines	Dolby Intellectual Property Licensing, LLC	Active
269823-KR-5	KR	8/28/2015	KR20150121854A	KR101983428	5/28/2019	Magnet management in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
269823-US-1	US	8/29/2014	US14/473216	US9602043	3/21/2017	Magnet management in electric machines	Dolby Intellectual Property Licensing, LLC	Active
269935-US-1	US	6/26/2013	US13/927683	US9216010	12/22/2015	System and method for aligning a biopsy collecting device	Joint ownership - Dolby Intellectual Property Licensing, LLC and Memorial Sloan Kettering Cancer Center	Active
270277-US-1	US	7/26/2013	US13/952317	US9362537	6/7/2016	Electrochemical cells, and related energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
270450-US-1	US	9/22/2014	US14/492170	US9385627	7/5/2016	Universal power conversion devices for alternating current electric apparatus	Dolby Intellectual Property Licensing, LLC	Active
271055-IT-6	IT	4/30/2015	1.02015E+14	N/A	9/25/2017		Dolby Intellectual Property Licensing, LLC	Active
271055-JP-2	JP	5/14/2015	JP2015098658A	JP6722426	7/15/2020	Thermal clamp device for electronic system	Dolby Intellectual Property Licensing, LLC	Active
271055-TW-5	TW	5/11/2015	TW104114895A	TWI663894	6/21/2019	Electronic device and method for removing heat from an electronic device	Dolby Intellectual Property Licensing, LLC	Active
271055-US-1	US	5/23/2014	US14/285720	US9668334	5/30/2017	Thermal clamp apparatus for electronic systems	Dolby Intellectual Property Licensing, LLC	Active
271087-US-1	US	7/1/2014	US14/321072	US9806380	10/31/2017	High temperature electrochemical cell structures, and methods for making	Dolby Intellectual Property Licensing, LLC	Active
271261-DE-8	DE	5/22/2015	EP15168809A	EP2947062	2/17/2021	Method for joining ceramic to metal	Dolby Intellectual Property Licensing, LLC	Active
271261-EP-5	EP	5/22/2015	EP15168809A	EP2947062	2/17/2021	Method for joining ceramic to metal	Dolby Intellectual Property Licensing, LLC	Active

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271261-FR-7	FR	5/22/2015	EP15168809A	EP2947062	2/17/2021	Method for joining ceramic to metal	Dolby Intellectual Property Licensing, LLC	Active
271261-GB-10	GB	5/22/2015	EP15168809A	EP2947062	2/17/2021	Method for joining ceramic to metal	Dolby Intellectual Property Licensing, LLC	Active
271261-IN-1	IN	5/23/2014	IN2368CH2014A	IN322482	10/11/2019	Method for joining ceramic to metal, and sealing	Dolby Intellectual Property Licensing, LLC	Active
271261-IT-9	IT	5/22/2015	EP15168809A	EP2947062	2/17/2021	Method for joining ceramic to metal	Dolby Intellectual Property Licensing, LLC	Active
271261-JP-4	JP	5/19/2015	JP2015101614A	JP6480806	3/13/2019	Method for bonding ceramic and metal and sealing structure thereof	Dolby Intellectual Property Licensing, LLC	Active
271261-KR-6	KR	5/22/2015	KR20150072036A	KR1023981 8	5/17/2022	Method for joining ceramic to metal, and sealing structure thereof	Dolby Intellectual Property Licensing, LLC	Active
271261-US-2	US	5/22/2015	US14/719742	US10103410	10/16/2018	Method for joining ceramic to metal, and sealing structure thereof	Dolby Intellectual Property Licensing, LLC	Active
271359-CN-1	CN	12/8/2014	CN201410747549A	CN10573025 7	5/22/2018	Propulsion system, energy management system and method	Dolby Intellectual Property Licensing, LLC	Active
271359-JP-2	JP	12/2/2015	JP2015235294A	JP6769706	10/14/2020	Propulsion system and energy management system and their methods	Dolby Intellectual Property Licensing, LLC	Active
271359-US-3	US	12/8/2015	US14/962332	US9643513	5/9/2017	Propelling system and energy management system and methods	Dolby Intellectual Property Licensing, LLC	Active
271380-US-1	US	10/7/2014	US14/507908	US9837654	12/5/2017	Power connector for a battery management system	Dolby Intellectual Property Licensing, LLC	Active
271404-US-1	US	7/7/2014	US14/324755	US9269028	2/23/2016	System and method for determining string similarity	Dolby Intellectual Property Licensing, LLC	Active
271471-CN-1	CN	10/27/2014	CN201410582236A	CN10563422 9	1/8/2019	Magneto	Dolby Intellectual Property Licensing, LLC	Active
271474-CN-3	CN	7/21/2016	CN201680051061A	CN10792513 8	5/11/2021	Energy storage device with reduced temperature variability between batteries	Dolby Intellectual Property Licensing, LLC	Active
271474-DE-7	DE	7/21/2016	EP16745353A	EP3345243	1/27/2021	Energy storage device with reduced temperature variability between cells	Dolby Intellectual Property Licensing, LLC	Active
271474-EP-4	EP	7/21/2016	EP16745353A	EP3345243	1/27/2021	Energy storage device with reduced temperature variability between cells	Dolby Intellectual Property Licensing, LLC	Active
271474-FR-6	FR	7/21/2016	EP16745353A	EP3345243	1/27/2021	Energy storage device with reduced temperature variability between cells	Dolby Intellectual Property Licensing, LLC	Active
271474-GB-8	GB	7/21/2016	EP16745353A	EP3345243	1/27/2021	Energy storage device with reduced temperature variability between cells	Dolby Intellectual Property Licensing, LLC	Active
271474-IN-5	IN	3/16/2018	IN201847009742A	IN406407	9/16/2022	Energy storage device with reduced temperature	Dolby Intellectual Property Licensing, LLC	Active
271474-US-1	US	9/2/2015	US14/843164	US9806387	10/31/2017	Energy storage device with reduced temperature variability between cells	Dolby Intellectual Property Licensing, LLC	Active
271785-US-1	US	12/16/2014	US14/572216	US9548518	1/17/2017	Methods for joining ceramic and metallic structures	Dolby Intellectual Property Licensing, LLC	Active
272354-US-2	US	12/19/2013	US14/133967	US9255779	2/9/2016	Wireless taper gauge and method of using same	Dolby Intellectual Property Licensing, LLC	Active
272442-CN-2	CN	7/22/2015	CN201510432791A	CN10532273 9	8/27/2019	The system and method for preventing stator permanent magnet from demagnetizing during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active
272442-DE-7	DE	7/20/2015	EP15177470A	EP2978111	11/18/2020	System and method for preventing stator permanent magnet demagnetization during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active

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272442-EP-3	EP	7/20/2015	EP15177470A	EP2978111	11/18/2020	System and method for preventing stator permanent magnet demagnetization during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active
272442-FR-6	FR	7/20/2015	EP15177470A	EP2978111	11/18/2020	System and method for preventing stator permanent magnet demagnetization during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active
272442-JP-4	JP	7/14/2015	JP2015140116A	JP6635697	1/29/2020	Systems and methods for preventing stator demagnetization during vacuum impregnation	Dolby Intellectual Property Licensing, LLC	Active
272442-KR-5	KR	7/22/2015	KR20150103826A	KR102411266	6/21/2022	System and method for preventing stator permanent magnet demagnetization during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active
272442-US-1	US	7/22/2014	US14/337469	US9673667	6/6/2017	System and method for preventing stator permanent magnet demagnetization during vacuum pressure impregnation	Dolby Intellectual Property Licensing, LLC	Active
272805-US-2	US	6/9/2014	US14/299116	US9246429	1/26/2016	Control method for reducing torque ripple in switched reluctance motors	Dolby Intellectual Property Licensing, LLC	Active
273156-US-1	US	12/1/2015	US14/956067	US10859563	12/8/2020	Erythrocyte aggregation and leukocyte isolation	Dolby Intellectual Property Licensing, LLC	Active
273156-US-5	US	12/7/2020	US17/113527	US11821891	11/21/2023	Erythrocyte aggregation and leukocyte isolation	Dolby Intellectual Property Licensing, LLC	Active
273252-CN-10	CN	1/30/2015	CN201911098959A	CN111055693	4/11/2023	Vehicle propulsion system with multi-channel dc bus and method for manufacturing the system	Dolby Intellectual Property Licensing, LLC	Active
273252-CN-4	CN	1/30/2015	CN201510050190A	CN104816641	11/26/2019	Vehicle propulsion system with multichannel dc bus and the method for manufacturing the system	Dolby Intellectual Property Licensing, LLC	Active
273252-IN-5	IN	1/2/2015	IN36CH2015A	IN36CH2015	7/1/2016	Vehicle propulsion system with multi-channel dc bus and	Dolby Intellectual Property Licensing, LLC	Active
273252-JP-3	JP	1/21/2015	JP2015009031A	JP6567830	8/28/2019	Vehicle propulsion system having a multi-channel dc bus and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
273252-JP-9	JP	4/1/2019	JP2019069591A	JP6774519	10/28/2020	Vehicle propulsion system with multi-channel dc bus and method of manufacturing the system	Dolby Intellectual Property Licensing, LLC	Active
273252-KR-7	KR	1/20/2015	KR20150009219A	KR101933538	12/28/2018	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273252-US-1	US	1/30/2014	US14/168224	US9834098	12/5/2017	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273252-US-13	US	8/29/2019	US16/555487	US10549648	2/4/2020	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273252-US-14	US	12/23/2019	US16/725151	US10933754	3/2/2021	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273252-US-15	US	2/1/2021	US17/163646	US11351874	6/7/2022	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273252-US-8	US	10/31/2017	US15/799045	US10442296	10/15/2019	Vehicle propulsion system with multi-channel dc bus and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active
273345-CN-2	CN	8/19/2015	CN201510764915A	CN105437992	2/5/2021	Vehicle propulsion system with energy storage system and optimization method for controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273345-CN-8	CN	8/19/2015	CN202010411753A	CN111746495	3/28/2023	Vehicle propulsion system with energy storage system and optimization method for controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active

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273345-DE-9	DE	8/17/2015	EP15181274A	EP2987674	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273345-EP-3	EP	8/17/2015	EP15181274A	EP2987674	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273345-JP-4	JP	8/17/2015	JP2015160261A	JP6659270	3/4/2020	Vehicle propulsion system with energy storage system and optimized method of controlling its operation	Dolby Intellectual Property Licensing, LLC	Active
273345-JP-7	JP	10/2/2019	JP2019182546A	JP6972076	11/24/2021	Vehicle propulsion system having energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273345-KR-5	KR	8/19/2015	KR20150116698A	KR102385058	4/12/2022	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273345-US-1	US	8/19/2014	US14/462765	US9878632	1/30/2018	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
273632-US-1	US	7/31/2014	US14/447968	US9913406	3/6/2018	System and method for controlling ambient temperature at a power-consuming site	Dolby Intellectual Property Licensing, LLC	Active
274422-US-1	US	8/1/2014	US14/449916	US9436866	9/6/2016	High sensitivity flat panel microbiology detection and enumeration system	Dolby Intellectual Property Licensing, LLC	Active
274610-BR-7	BR	1/12/2016	BR102016006601A	BR102016006601	6/14/2022	Vehicle system and method for power transfer in a vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274610-CA-9	CA	1/7/2016	CA2916815A	CA2916815	5/26/2020	Bi-directional dc-dc power converter for a vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274610-CN-3	CN	1/13/2016	CN201610019786A	CN105790588	2/7/2020	Bidirectional dc-dc power converter for vehicle systems	Dolby Intellectual Property Licensing, LLC	Active
274610-IN-4	IN	1/13/2016	IN201644001185A	IN409927	10/28/2022	Bi-directional dc-dc power converter for a vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274610-JP-2	JP	1/8/2016	JP2016002139A	JP6713774	6/24/2020	Bidirectional dc/dc power converter for vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274610-KR-5	KR	1/13/2016	KR20160004444A	KR101938331	4/11/2019	Bi-directional dc-dc power converter for a vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274610-MX-8	MX	1/12/2016	MX2016000431A	MX352791	12/7/2017	Bi-directional dc-dc power converter for a vehicle system.	Dolby Intellectual Property Licensing, LLC	Active
274610-US-1	US	1/13/2015	US14/595706	US9809119	11/7/2017	Bi-directional dc-dc power converter for a vehicle system	Dolby Intellectual Property Licensing, LLC	Active
274626-US-1	US	11/21/2014	US14/550408	US9748564	8/29/2017	Electrode compositions and related energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
274698-CA-5	CA	2/23/2015	CA2942042A	CA2942042	7/12/2022	System architecture for wireless metrological devices	Dolby Intellectual Property Licensing, LLC	Active
274698-CN-6	CN	2/23/2015	CN201580014431A	CN106462532	11/29/2019	The system architecture of wireless measuring equipment	Dolby Intellectual Property Licensing, LLC	Active
274698-JP-8	JP	2/23/2015	JP2016556321A	JP6599349	10/30/2019	System architecture for wireless weighing devices	Dolby Intellectual Property Licensing, LLC	Active
274698-MX-9	MX	2/23/2015	MX2016012012A	MX361201012	12/7/2016	System architecture for wireless metrological devices.	Dolby Intellectual Property Licensing, LLC	Active

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274698-TW-4	TW	3/17/2015	TW104108520A	TWI663855	6/21/2019	System architecture for wireless metrological devices	Dolby Intellectual Property Licensing, LLC	Active
274698-US-2	US	12/16/2014	US14/571973	US10193979	1/29/2019	System architecture for wireless metrological devices	Dolby Intellectual Property Licensing, LLC	Active
274886-CN-1	CN	10/27/2014	CN201410581804.A	CN105590713	3/8/2019	Permanent magnet and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
274984-CA-3	CA	6/23/2015	CA2952661A	CA2952661	1/17/2023	Integrated micro-electromechanical switches and a related method thereof	Dolby Intellectual Property Licensing, LLC	Active
274984-CN-4	CN	6/23/2015	CN201580034300A	CN106415772	8/13/2019	Integrated micro-electro-mechanical switch and its correlation technique	Dolby Intellectual Property Licensing, LLC	Active
274984-DE-8	DE	6/23/2015	EP15810992A	EP3161847	5/31/2023	Integrated micro-electromechanical switches and a related method thereof	Dolby Intellectual Property Licensing, LLC	Active
274984-EP-5	EP	6/23/2015	EP15810992A	EP3161847	5/31/2023	Integrated micro-electromechanical switches and a related method thereof	Dolby Intellectual Property Licensing, LLC	Active
274984-JP-6	JP	6/23/2015	JP2016574280A	JP6781048	11/4/2020	Integrated microelectromechanical switches and related methods	Dolby Intellectual Property Licensing, LLC	Active
274984-SG-7	SG	6/23/2015	SG11201610176YA	SG11201610176Y	1/27/2017	Integrated micro-electromechanical switches and a related method thereof	Dolby Intellectual Property Licensing, LLC	Active
274984-US-1	US	6/25/2014	US14/314344	US9117610	8/25/2015	Integrated micro-electromechanical switches and a related method thereof	Dolby Intellectual Property Licensing, LLC	Active
275094-CN-1	CN	1/14/2015	CN201510019281A	CN105835708	4/23/2019	Vehicle drive system and energy management control method	Dolby Intellectual Property Licensing, LLC	Active
275094-JP-2	JP	1/13/2016	JP2016004001A	JP6920010	8/18/2021	A vehicle drive system and an energy control method	Dolby Intellectual Property Licensing, LLC	Active
275094-KR-5	KR	1/14/2016	KR20160004985A	KR102460194	10/27/2022	Vehicle driving system and energy control methods	Dolby Intellectual Property Licensing, LLC	Active
275094-US-3	US	1/14/2016	US14/995936	US10227019	3/12/2019	Vehicle driving system and energy control methods	Dolby Intellectual Property Licensing, LLC	Active
275150-US-1	US	8/26/2014	US14/469002	US9520798	12/13/2016	Multi-level dc-dc converter with galvanic isolation and adaptive conversion ratio	Dolby Intellectual Property Licensing, LLC	Active
275187-BR-7	BR	9/30/2015	BR102015025127A	BR102015025127	6/14/2016	Wireless charging system and system	Dolby Intellectual Property Licensing, LLC	Active
275187-CA-3	CA	10/1/2015	CA2907252A	CA2907252	4/4/2023	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-CN-4	CN	10/9/2015	CN201510647562A	CN105517217	11/6/2020	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-EP-8	EP	10/7/2015	EP15188811A	EP3007304	4/13/2016	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-IN-1	IN	10/10/2014	IN5098CH2014A	IN412397	12/2/2022	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-JP-5	JP	10/5/2015	JP2015197285A	JP6956461	11/2/2021	The system and method for contactless energy transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-KR-10	KR	3/24/2023	KR20230038621A	KR20230044168	4/3/2023	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-KR-6	KR	9/30/2015	KR20150137990A	KR102449510	9/29/2022	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-KR-9	KR	9/26/2022	KR20220121750A	KR102515488	3/29/2023	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active

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275187-US-2	US	10/8/2015	US14/878554	US10978880	4/13/2021	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275327-DE-6	DE	7/13/2016	EP16829011A	EP3344574	4/12/2023	Refractory seed metal for electroplated mems structures	Dolby Intellectual Property Licensing, LLC	Active
275327-EP-5	EP	7/13/2016	EP16829011A	EP3344574	4/12/2023	Refractory seed metal for electroplated mems structures	Dolby Intellectual Property Licensing, LLC	Active
275327-JP-4	JP	7/13/2016	JP2018511120A	JP6820913	1/27/2021	High melting point seed metal with electroplated mems structure	Dolby Intellectual Property Licensing, LLC	Active
275327-TW-3	TW	8/22/2016	TW105126789A	TWI701212	8/11/2020	Refractory seed metal for electroplated mems structures	Dolby Intellectual Property Licensing, LLC	Active
275327-US-1	US	9/3/2015	US14/844132	US9845235	12/19/2017	Refractory seed metal for electroplated mems structures	Dolby Intellectual Property Licensing, LLC	Active
275483-CN-5	CN	8/19/2015	CN201510511035A	CN105365599	10/23/2020	Vehicle propulsion system with energy storage system and optimization method for controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-DE-7	DE	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-EP-3	EP	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-ES-9	ES	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-FR-6	FR	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-GB-10	GB	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-IT-8	IT	8/17/2015	EP15181296A	EP2987673	3/8/2023	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-JP-2	JP	8/13/2015	JP2015159747A	JP6700006	5/27/2020	Vehicle propulsion system with energy storage system and optimized method of controlling its operation	Dolby Intellectual Property Licensing, LLC	Active
275483-KR-4	KR	8/19/2015	KR20150116684A	KR10194056	4/11/2019	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275483-US-1	US	8/19/2014	US14/462792	US9399407	7/26/2016	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275546-CN-1	CN	9/24/2014	CN201410493810A	CN10550963	1/1/2019	For the measuring system and measurement method of measure geometry feature	Dolby Intellectual Property Licensing, LLC	Active
275546-DE-7	DE	9/23/2015	EP15186566A	EP3001139	2/6/2019	System and method of measuring geometric characteristics of an object	Dolby Intellectual Property Licensing, LLC	Active
275546-EP-2	EP	9/23/2015	EP15186566A	EP3001139	2/6/2019	System and method of measuring geometric characteristics of an object	Dolby Intellectual Property Licensing, LLC	Active

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275546-FR-6	FR	9/23/2015	EP15186566A	EP3001139	2/6/2019	System and method of measuring geometric characteristics of an object	Dolby Intellectual Property Licensing, LLC	Active
275546-GB-8	GB	9/23/2015	EP15186566A	EP3001139	2/6/2019	System and method of measuring geometric characteristics of an object	Dolby Intellectual Property Licensing, LLC	Active
275546-JP-3	JP	9/17/2015	JP2015185536A	JP6570938	9/4/2019	System and method for measuring geometric features of an object	Dolby Intellectual Property Licensing, LLC	Active
275546-KR-4	KR	9/24/2015	KR20150135539A	KR102004576	7/26/2019	System and method of measuring geometric characteristics of object	Dolby Intellectual Property Licensing, LLC	Active
275546-US-5	US	9/24/2015	US14/863481	US9970753	5/15/2018	System and method of measuring geometric characteristics of object	Dolby Intellectual Property Licensing, LLC	Active
275550-US-1	US	10/30/2014	US14/528013	US9627897	4/18/2017	String current limited battery charging control	Dolby Intellectual Property Licensing, LLC	Active
275550-US-2	US	4/17/2017	US15/488813	US10218188	2/26/2019	String current limited battery charging control	Dolby Intellectual Property Licensing, LLC	Active
275603-US-1	US	9/8/2014	US14/479937	US9783185	10/10/2017	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275603-US-2	US	9/8/2014	US14/480002	US9889752	2/13/2018	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275603-US-3	US	7/13/2016	US15/208777	US10081350	9/25/2018	Vehicle propulsion system having an energy storage system and optimized method of controlling operation thereof	Dolby Intellectual Property Licensing, LLC	Active
275796-US-1	US	10/9/2014	US14/510306	US10391878	8/27/2019	System and method for calibrating battery state of charge	Dolby Intellectual Property Licensing, LLC	Active
276670-US-1	US	1/27/2015	US14/606068	US9897658	2/20/2018	System and method for detecting battery end of discharge	Dolby Intellectual Property Licensing, LLC	Active
276753A-US-1	US	1/30/2015	US14/609549	US10126723	11/13/2018	Performing passive maintenance on an energy storage farm	Dolby Intellectual Property Licensing, LLC	Active
276753-US-1	US	1/30/2015	US14/609528	US9979195	5/22/2018	Power distribution in energy storage farms	Dolby Intellectual Property Licensing, LLC	Active
277187-CN-6	CN	4/5/2016	CN201680084281A	CN109072166	12/21/2018	Activated blood platelet composition with adjustable growth factor levels	Dolby Intellectual Property Licensing, LLC	Active
277187-JP-5	JP	4/5/2016	JP2018550519A	JP6840770	3/10/2021	Activated platelet composition capable of regulating growth factor levels	Dolby Intellectual Property Licensing, LLC	Active
277187-JP-8	JP	2/17/2021	JP2021023806A	JP7248721	3/29/2023	Activated platelet composition with tunable growth factor level	Dolby Intellectual Property Licensing, LLC	Active
277187-KR-7	KR	4/5/2016	KR20187032082A	KR102516995	3/31/2023	Activated platelet composition with tunable growth factor levels	Dolby Intellectual Property Licensing, LLC	Active
277187-US-1	US	3/31/2015	US14/674971	US9752120	9/5/2017	Activated platelet composition with tunable growth factor level	Dolby Intellectual Property Licensing, LLC	Active
277187-US-3	US	9/1/2017	US15/694635	US10927345	2/23/2021	Activated platelet composition with tunable growth factor level	Dolby Intellectual Property Licensing, LLC	Active
277201-JP-3	JP	12/5/2016	JP2016235520A	JP6829594	2/10/2021	Systems and methods for hair segmentation	Dolby Intellectual Property Licensing, LLC	Active
277201-US-1	US	12/16/2015	US14/970580	US9830710	11/28/2017	Systems and methods for hair segmentation	Dolby Intellectual Property Licensing, LLC	Active
277298-CA-4	CA	2/2/2016	CA2977788A	CA2977788	8/29/2023	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active

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277298-CN-7	CN	2/2/2016	CN201680013454A	CN107430962	10/18/2019	For reducing the mechatronic systems substrate attachment of thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-DE-11	DE	2/2/2016	EP16710509A	EP3266033	8/24/2022	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-EP-5	EP	2/2/2016	EP16710509A	EP3266033	8/24/2022	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-JP-6	JP	2/2/2016	JP2017544877A	JP6854769	4/7/2021	Electromechanical system board attachment for reducing thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-KR-9	KR	2/2/2016	KR20177026875A	KR102591895	10/19/2023	Attachment to electromechanical system substrate for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-SG-8	SG	2/2/2016	SG11201706665UA	SG11201706665U	9/28/2017	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-TW-3	TW	2/16/2016	TW105104499A	TWI664136	7/1/2019	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277298-US-1	US	3/2/2015	US14/634981	US9663347	5/30/2017	Electromechanical system substrate attachment for reduced thermal deformation	Dolby Intellectual Property Licensing, LLC	Active
277870-CN-4	CN	12/11/2015	CN201511036231A	CN105783693	1/21/2020	Method and device for measuring the thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-DE-7	DE	12/4/2015	EP15197958A	EP3032216	11/1/2017	Method and apparatus for measuring thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-GB-8	GB	12/4/2015	EP15197958A	EP3032216	11/1/2017	Method and apparatus for measuring thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-JP-3	JP	12/9/2015	JP2015239807A	JP6664945	3/13/2020	Method and apparatus for measuring the thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-KR-5	KR	12/11/2015	KR20150177162A	KR101878542	7/13/2018	Method and apparatus for measuring thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-TW-6	TW	12/1/2015	TW104140142A	TWI636233	9/21/2018	Method and apparatus for measuring thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277870-US-1	US	12/12/2014	US14/568912	US9441937	9/13/2016	Method and apparatus for measuring thickness of an object	Dolby Intellectual Property Licensing, LLC	Active
277888A-US-1	US	3/13/2015	US14/657204	US9913628	3/13/2018	System and method for attaching a biopsy collecting device to a spectroscopy system	Joint ownership - Dolby Intellectual Property Licensing, LLC and Memorial Sloan Kettering Cancer Center	Active
277888-US-1	US	3/13/2015	US14/657085	US10531862	1/14/2020	System and method for attaching a biopsy collecting device to a spectroscopy system	Joint ownership - Dolby Intellectual Property Licensing, LLC and Memorial Sloan Kettering Cancer Center	Active
278163-US-1	US	5/22/2015	US14/720005	US9899695	2/20/2018	Zinc-based electrolyte compositions, and related electrochemical processes and articles	Dolby Intellectual Property Licensing, LLC	Active
278667-US-1	US	8/20/2015	US14/831357	US9567232	2/14/2017	Method for preparing sodium chloro-aluminate	Dolby Intellectual Property Licensing, LLC	Active
278828-US-1	US	5/20/2015	US14/717286	US10069457	9/4/2018	System for mounting a microinverter to a photovoltaic panel and method of making same	Dolby Intellectual Property Licensing, LLC	Active
278831-US-1	US	5/20/2015	US14/717195	US10164566	12/25/2018	Universal microinverter mounting bracket for a photovoltaic panel and associated method	Dolby Intellectual Property Licensing, LLC	Active
278851-US-1	US	5/27/2015	US14/722251	US9705422	7/11/2017	System and method for soft switching power inversion	Dolby Intellectual Property Licensing, LLC	Active
278961-JP-3	JP	7/8/2016	JP2016135586A	JP6859034	4/14/2021	Circuits and methods for synchronous rectification in resonant transducers	Dolby Intellectual Property Licensing, LLC	Active

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278961-US-1	US	7/23/2015	US14/806793	US9887634	2/6/2018	Circuits and methods for synchronous rectification in resonant converters	Dolby Intellectual Property Licensing, LLC	Active
279301A-DE-6	DE	7/21/2016	EP16754013A	EP3341323	11/17/2021	Radio frequency micro-electromechanical systems having inverted microstrip transmission lines and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
279301A-EP-5	EP	7/21/2016	EP16754013A	EP3341323	11/17/2021	Radio frequency micro-electromechanical systems having inverted microstrip transmission lines and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
279301A-JP-4	JP	7/21/2016	JP2018511119A	JP6868006	5/12/2021	The radio frequency micro-electro-mechanical system which has the reversed microstrip transmission line, and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
279301A-TW-3	TW	8/8/2016	TW105125205A	TWI641015	11/11/2018	Radio frequency micro-electromechanical systems having inverted microstrip transmission lines and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
279301A-US-1	US	8/28/2015	US14/839464	US9954263	4/24/2018	Radio frequency micro-electromechanical systems having inverted microstrip transmission lines and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
279321-US-1	US	5/21/2015	US14/718146	US9786956	10/10/2017	Current collector design to reduce granule bed disruption	Dolby Intellectual Property Licensing, LLC	Active
279321-US-2	US	10/5/2017	US15/725310	US10411305	9/10/2019	Current collector design to reduce granule bed disruption	Dolby Intellectual Property Licensing, LLC	Active
279412-CN-3	CN	7/27/2016	CN201680052540A	CN108140764	5/11/2021	Energy storage device with improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-DE-7	DE	7/27/2016	EP16747982A	EP3347933	5/20/2020	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-EP-5	EP	7/27/2016	EP16747982A	EP3347933	5/20/2020	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-FR-6	FR	7/27/2016	EP16747982A	EP3347933	5/20/2020	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-GB-9	GB	7/27/2016	EP16747982A	EP3347933	5/20/2020	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-IN-4	IN	3/27/2018	IN201847011310A	IN378849	10/15/2021	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-IT-8	IT	7/27/2016	EP16747982A	EP3347933	5/20/2020	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279412-US-1	US	9/9/2015	US14/848682	US10177354	1/8/2019	Energy storage device having improved thermal performance	Dolby Intellectual Property Licensing, LLC	Active
279748-CN-3	CN	10/3/2016	CN201680058574A	CN108140816	2/8/2022	Anode composition for over-discharge protection	Dolby Intellectual Property Licensing, LLC	Active
279748-IN-4	IN	4/26/2018	IN201847015772A	IN367351	5/28/2021	Positive electrode composition for overdischarge protection	Dolby Intellectual Property Licensing, LLC	Active
279758-CN-3	CN	9/9/2016	CN201680075610A	CN108369880	5/19/2020	Auxiliary circuit for a relay circuit of a micro-electromechanical system	Dolby Intellectual Property Licensing, LLC	Active
279758-JP-4	JP	9/9/2016	JP2018520446A	JP6821676	1/27/2021	Auxiliary circuit of micro electromechanical system relay circuit	Dolby Intellectual Property Licensing, LLC	Active
279758-US-1	US	10/22/2015	US14/919769	US10083811	9/25/2018	Auxiliary circuit for micro-electromechanical system relay circuit	Dolby Intellectual Property Licensing, LLC	Active
279759-CN-3	CN	10/18/2016	CN201680075721A	CN108475594	12/14/2021	Relay circuit of micro-electromechanical system	Dolby Intellectual Property Licensing, LLC	Active

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279759-JP-4	JP	10/18/2016	JP2018520445A	JP6917367	8/11/2021	Micro electric machine system relay circuit	Dolby Intellectual Property Licensing, LLC	Active
279759-US-1	US	10/22/2015	US14/919797	US10068733	9/4/2018	Micro-electromechanical system relay circuit	Dolby Intellectual Property Licensing, LLC	Active
279765-CN-4	CN	10/18/2016	CN201680075710A	CN108369873	10/23/2020	Isolated control circuit and driver for micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
279765-DE-6	DE	10/18/2016	EP16788894A	EP3365907	8/10/2022	Isolated control circuit and driver for micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
279765-EP-3	EP	10/18/2016	EP16788894A	EP3365907	8/10/2022	Isolated control circuit and driver for micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
279765-JP-5	JP	10/18/2016	JP2018520447A	JP6924751	8/25/2021	The control circuit and driver with which it insulated for the micro-electro-mechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
279765-US-1	US	10/22/2015	US14/919833	US9997317	6/12/2018	Isolated control circuit and driver for micro-electromechanical system switch	Dolby Intellectual Property Licensing, LLC	Active
279791-US-1	US	12/16/2015	US14/971413	US9639725	5/2/2017	Tracking associate for factory and warehousing optimization	Dolby Intellectual Property Licensing, LLC	Active
280212-CN-3	CN	7/21/2016	CN201680050332A	CN107925046	6/1/2021	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-DE-7	DE	7/21/2016	EP16745027A	EP3345233	2/17/2021	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-EP-4	EP	7/21/2016	EP16745027A	EP3345233	2/17/2021	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-FR-6	FR	7/21/2016	EP16745027A	EP3345233	2/17/2021	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-GB-8	GB	7/21/2016	EP16745027A	EP3345233	2/17/2021	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-IN-5	IN	2/21/2018	IN201847006601A	IN380685	1/14/2022	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280212-US-1	US	8/31/2015	US14/840702	US9692245	6/27/2017	Battery management system and power connector	Dolby Intellectual Property Licensing, LLC	Active
280268-US-1	US	8/11/2015	US14/823852	US10001415	6/19/2018	Multifunctional sensor	Dolby Intellectual Property Licensing, LLC	Active
280467-BR-6	BR	3/30/2016	BR102016007005A	BR1020160077005	8/16/2022	Multi-source power storage system and method for power control and management	Dolby Intellectual Property Licensing, LLC	Active
280467-CA-9	CA	3/17/2016	CA2924167A	CA2924167	1/9/2024	Multi-source energy storage system and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280467-DE-10	DE	3/30/2016	EP16162905A	EP3075595	10/25/2023	A multi-source energy storage system and method for energy management and control	Dolby Intellectual Property Licensing, LLC	Active
280467-EP-4	EP	3/30/2016	EP16162905A	EP3075595	10/25/2023	A multi-source energy storage system and method for energy management and control	Dolby Intellectual Property Licensing, LLC	Active
280467-IN-3	IN	3/15/2016	IN201644008946A	IN446624	8/25/2023	Multi-source energy storage system and energy management	Dolby Intellectual Property Licensing, LLC	Active
280467-JP-5	JP	3/22/2016	JP2016056436A	JP6742771	8/19/2020	Multi-source energy storage system and method for energy management control	Dolby Intellectual Property Licensing, LLC	Active
280467-KR-7	KR	3/29/2016	KR20160037805A	KR102495179	1/27/2023	Multi-source energy storage system and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280467-MX-8	MX	3/30/2016	MX2016004109A	MX361187	11/29/2018	Multi-source energy storage system and energy management and control method.	Dolby Intellectual Property Licensing, LLC	Active

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280467-US-2	US	3/31/2016	US15/086744	US10056755	8/21/2018	Multi-source energy storage system and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280508-BR-6	BR	3/30/2016	BR102016006966A	BR102016006966	9/13/2022	Energy storage system and method	Dolby Intellectual Property Licensing, LLC	Active
280508-CA-9	CA	3/29/2016	CA2925245A	CA2925245	9/22/2020	Energy storage system with range extender and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280508-CN-1	CN	3/31/2015	CN201510148686A	CN106143170	11/17/2020	Energy storage system with range extender and energy management control method	Dolby Intellectual Property Licensing, LLC	Active
280508-DE-10	DE	3/30/2016	EP16162903A	EP3078536	12/7/2022	Energy storage system with range extender and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280508-EP-4	EP	3/30/2016	EP16162903A	EP3078536	12/7/2022	Energy storage system with range extender and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280508-IN-3	IN	3/24/2016	IN201644010339A	IN425068	3/17/2023	Energy storage system with range extender and energy	Dolby Intellectual Property Licensing, LLC	Active
280508-JP-5	JP	3/24/2016	JP2016059360A	JP6956470	11/2/2021	The energy storage system and energy-management control method which have a range extender	Dolby Intellectual Property Licensing, LLC	Active
280508-KR-7	KR	3/25/2016	KR20160036074A	KR101940373	1/18/2019	Energy storage system with range extender and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280508-MX-8	MX	3/30/2016	MX2016004108A	MX354695	3/15/2018	Energy storage system with range extender and energy management and control method.	Dolby Intellectual Property Licensing, LLC	Active
280508-US-2	US	3/31/2016	US15/087400	US9899843	2/20/2018	Energy storage system with range extender and energy management and control method	Dolby Intellectual Property Licensing, LLC	Active
280514-BR-6	BR	3/30/2016	BR102016007002A	BR102016007002	8/16/2022	Power supply system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280514-CA-9	CA	3/17/2016	CA2923952A	CA2923952	8/29/2023	Power supply system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280514-IN-3	IN	3/15/2016	IN201644008947A	IN445279	8/18/2023	Power supply system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280514-JP-5	JP	3/24/2016	JP2016059361A	JP6775978	10/28/2020	Power generation system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280514-KR-7	KR	3/28/2016	KR20160036624A	KR102614468	12/14/2023	Power supply system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280514-MX-8	MX	3/30/2016	MX2016004110A	MX366720	7/22/2019	Power supply system and energy storage system.	Dolby Intellectual Property Licensing, LLC	Active
280514-US-2	US	3/31/2016	US15/086218	US10483872	11/19/2019	Power supply system and energy storage system	Dolby Intellectual Property Licensing, LLC	Active
280635-CN-1	CN	8/19/2015	CN201510511572A	CN106469807	11/26/2019	Cathode components, energy accumulating device and method	Dolby Intellectual Property Licensing, LLC	Active
280638-CN-3	CN	8/26/2016	CN201610730574A	CN106476635	5/4/2021	Hybrid system having a plurality of energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
280638-IN-5	IN	8/25/2016	IN201644028932A	IN450992	9/15/2023	Hybrid system with multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
280638-JP-4	JP	8/19/2016	JP2016160925A	JP7038469	3/18/2022	The hybrid system which has several energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
280638-KR-6	KR	8/25/2016	KR20160108203A	KR102530203	5/8/2023	Hybrid system with multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
280638-US-1	US	8/28/2015	US14/838485	US10272788	4/30/2019	Hybrid system with multiple energy storage devices	Dolby Intellectual Property Licensing, LLC	Active

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280661-US-1	US	8/27/2015	US14/837082	US10270275	4/23/2019	Systems and methods for controlling energy storage systems having multiple battery types	Dolby Intellectual Property Licensing, LLC	Active
280946-CN-4	CN	9/8/2016	CN201680058952A	CN108140910	7/13/2021	Heat flux assembly for energy storage device	Dolby Intellectual Property Licensing, LLC	Active
280946-DE-5	DE	9/8/2016	EP16775022A	EP3347941	12/23/2020	Heat flux assembly for an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
280946-EP-3	EP	9/8/2016	EP16775022A	EP3347941	12/23/2020	Heat flux assembly for an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
280946-GB-6	GB	9/8/2016	EP16775022A	EP3347941	12/23/2020	Heat flux assembly for an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
280946-US-1	US	9/9/2015	US14/848670	US10333184	6/25/2019	Heat flux assembly for an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
281041-CN-3	CN	3/30/2017	CN201710202904A	CN107262956	1/11/2022	Co-melting brazing composition and related method and device	Dolby Intellectual Property Licensing, LLC	Active
281041-DE-5	DE	3/23/2017	EP17162643A	EP3225352	8/19/2020	Eutectic brazing compositions, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281041-EP-4	EP	3/23/2017	EP17162643A	EP3225352	8/19/2020	Eutectic brazing compositions, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281041-GB-6	GB	3/23/2017	EP17162643A	EP3225352	8/19/2020	Eutectic brazing compositions, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281041-IN-1	IN	3/30/2016	IN201641010951A	IN475913	12/8/2023	Eutectic brazing compositions, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281056-CN-3	CN	3/30/2017	CN201710202944A	CN107262961	9/24/2021	Brazing composition for malleable brazing structure and related method and device	Dolby Intellectual Property Licensing, LLC	Active
281056-DE-6	DE	3/23/2017	EP17162634A	EP3225351	5/6/2020	Brazing compositions for ductile braze structures, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281056-EP-4	EP	3/23/2017	EP17162634A	EP3225351	5/6/2020	Brazing compositions for ductile braze structures, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281056-FR-5	FR	3/23/2017	EP17162634A	EP3225351	5/6/2020	Brazing compositions for ductile braze structures, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281056-GB-7	GB	3/23/2017	EP17162634A	EP3225351	5/6/2020	Brazing compositions for ductile braze structures, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281056-IN-1	IN	3/30/2016	IN201641010952A	IN514780	3/1/2024	Brazing compositions for ductile braze structures, and	Dolby Intellectual Property Licensing, LLC	Active
281056-US-2	US	3/30/2017	US15/474273	US10549372	2/4/2020	Brazing compositions for ductile braze structures, and related processes and devices	Dolby Intellectual Property Licensing, LLC	Active
281127-CN-5	CN	7/20/2016	CN201680048688A	CN107923953	1/5/2021	System and method for sampling current measurements in an energy storage device	Dolby Intellectual Property Licensing, LLC	Active
281127-DE-7	DE	7/20/2016	EP16747937A	EP3338101	5/4/2022	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281127-EP-3	EP	7/20/2016	EP16747937A	EP3338101	5/4/2022	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281127-FR-6	FR	7/20/2016	EP16747937A	EP3338101	5/4/2022	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281127-GB-9	GB	7/20/2016	EP16747937A	EP3338101	5/4/2022	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281127-IN-4	IN	2/21/2018	IN201847006600A	IN476984	12/8/2023	Systems and methods to sample current measurements in	Dolby Intellectual Property Licensing, LLC	Active

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281127-IT-8	IT	7/20/2016	EP16747937A	EP3338101	5/4/2022	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281127-US-1	US	8/19/2015	US14/829798	US10156626	12/18/2018	Systems and methods to sample current measurements in energy storage devices	Dolby Intellectual Property Licensing, LLC	Active
281133-AU-11	AU	12/29/2016	AU2016380342A	AU2016380342	4/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-BR-5	BR	12/29/2016	BR112018013444A	BR112018013444	2/12/2019	Methods for generating an activated product and for controlling clot mechanical strength in a platelet gel	Dolby Intellectual Property Licensing, LLC	Active
281133-CN-20	CN	12/29/2016	CN202211454001A	CN115873793	3/31/2023	Calcium control activation of platelets through electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-CN-9	CN	12/29/2016	CN201680082886A	CN108697763	12/9/2022	Calcium control activation of platelets through electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-DE-16	DE	12/29/2016	EP16829375A	EP3397268	7/8/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-DE-22	DE	12/29/2016	EP20184433A	EP3738604	9/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-EP-13	EP	12/29/2016	EP20184433A	EP3738604	9/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-EP-3	EP	12/29/2016	EP16829375A	EP3397268	7/8/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-FR-15	FR	12/29/2016	EP16829375A	EP3397268	7/8/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-FR-21	FR	12/29/2016	EP20184433A	EP3738604	9/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-GB-18	GB	12/29/2016	EP16829375A	EP3397268	7/8/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-GB-24	GB	12/29/2016	EP20184433A	EP3738604	9/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-IN-10	IN	6/26/2018	IN201847023787A	IN466802	11/10/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-IT-17	IT	12/29/2016	EP16829375A	EP3397268	7/8/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-IT-23	IT	12/29/2016	EP20184433A	EP3738604	9/13/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-JP-8	JP	12/29/2016	JP2018533697A	JP7050680	4/8/2022	The calcium control activation of the blood platelets by electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-MX-6	MX	12/29/2016	MX2018008146A	MX2018008146	12/6/2018	Activation of platelets controlled by calcium through electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-RU-7	RU	12/29/2016	RU2018121952A	RU2742937	2/11/2021	Calcium-regulated thrombocyte activation by electric stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-US-1	US	12/30/2015	US14/984988	US10633645	4/28/2020	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-US-14	US	4/16/2020	US16/850727	US11591590	2/28/2023	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281750-AU-2	AU	8/17/2016	AU2016216599A	AU2016216599	8/6/2020	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-CA-3	CA	8/18/2016	CA2939710A	CA2939710	10/10/2023	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active

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281750-CN-4	CN	8/31/2016	CN201610773374A	CN106482755	3/9/2021	Multi-axis magnetoresistive sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-DE-10	DE	8/17/2016	EP16184430A	EP3139189	10/14/2020	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-EP-5	EP	8/17/2016	EP16184430A	EP3139189	10/14/2020	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-FR-9	FR	8/17/2016	EP16184430A	EP3139189	10/14/2020	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-GB-11	GB	8/17/2016	EP16184430A	EP3139189	10/14/2020	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-IN-6	IN	8/26/2016	IN201644029028A	IN475114	12/1/2023	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-JP-7	JP	8/23/2016	JP2016162312A	JP7445372	3/7/2024	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-KR-8	KR	8/25/2016	KR20160108218A	KR102556711	7/17/2023	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
281750-US-1	US	9/1/2015	US14/842578	US9995600	6/12/2018	Multi-axis magneto-resistance sensor package	Dolby Intellectual Property Licensing, LLC	Active
282268-US-1	US	11/30/2015	US14/954108	US9879996	1/30/2018	System and method of electrostatic carouseling for gyrocompassing	Dolby Intellectual Property Licensing, LLC	Active
282674-US-2	US	12/10/2015	US14/964829	US10192050	1/29/2019	Methods, systems, apparatus, and storage media for use in detecting anomalous behavior and/or in preventing data loss	Dolby Intellectual Property Licensing, LLC	Active
283013-US-1	US	12/29/2015	US14/982735	US10511163	12/17/2019	Low capacitance surge suppression device	Dolby Intellectual Property Licensing, LLC	Active
283249-DE-12	DE	4/24/2017	EP20167095A	EP3723242	12/29/2021	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-DE-8	DE	4/24/2017	EP17167677A	EP3240144	4/15/2020	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-EP-10	EP	4/24/2017	EP20167095A	EP3723242	12/29/2021	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-EP-4	EP	4/24/2017	EP17167677A	EP3240144	4/15/2020	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-FR-11	FR	4/24/2017	EP20167095A	EP3723242	12/29/2021	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-GB-13	GB	4/24/2017	EP20167095A	EP3723242	12/29/2021	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-GB-9	GB	4/24/2017	EP17167677A	EP3240144	4/15/2020	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-IN-7	IN	4/22/2017	IN201744014355A	IN462831	11/3/2023	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-JP-14	JP	1/28/2022	JP2022011367A	JP7337973	9/4/2023	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-JP-3	JP	4/20/2017	JP2017083282A	JP7330661	8/22/2023	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-KR-6	KR	4/25/2017	KR20170052909A	KR102393551	5/4/2022	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active
283249-US-2	US	12/2/2016	US15/367261	US10439456	10/8/2019	Sleeve rotor synchronous reluctance electric machine	Dolby Intellectual Property Licensing, LLC	Active

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283282-CH-11	CH	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-CN-3	CN	11/10/2016	CN201680078960A	CN108575100	4/12/2022	Voltage grouping of energy storage unit	Dolby Intellectual Property Licensing, LLC	Active
283282-DE-8	DE	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-EP-4	EP	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-FR-7	FR	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-GB-12	GB	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-IN-5	IN	5/10/2018	IN201847017577A	IN477803	12/8/2023	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-IT-9	IT	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-SE-10	SE	11/10/2016	EP16798910A	EP3375064	12/29/2021	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-US-1	US	11/13/2015	US14/940445	US9837843	12/5/2017	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283282-ZA-6	ZA	5/18/2018	ZA201803330A	ZA201803330	2/27/2019	Voltage grouping of energy storage units	Dolby Intellectual Property Licensing, LLC	Active
283283-US-1	US	11/13/2015	US14/940473	US10020544	7/10/2018	Adjustable tap location for energy storage cells	Dolby Intellectual Property Licensing, LLC	Active
283492-CN-1	CN	12/18/2015	CN201510960140A	CN106899046	3/27/2020	Energy conversion system	Dolby Intellectual Property Licensing, LLC	Active
283495-JP-3	JP	3/30/2017	JP2017066602A	JP6866206	4/28/2021	A charging device, a system, and a method	Dolby Intellectual Property Licensing, LLC	Active
283495-US-2	US	3/30/2017	US15/473754	US10498146	12/3/2019	Charging device, system and method	Dolby Intellectual Property Licensing, LLC	Active
283501-BR-7	BR	2/16/2017	BR102017003133A	BR102017003133	4/18/2023	Stop-stop system for a vehicle and method of manufacturing a start-stop system	Dolby Intellectual Property Licensing, LLC	Active
283501-CN-4	CN	2/17/2017	CN201710088562A	CN107089233	2/15/2022	Starting/stopping system for vehicle and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
283501-DE-9	DE	2/14/2017	EP17156019A	EP3211212	5/15/2019	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283501-EP-6	EP	2/14/2017	EP17156019A	EP3211212	5/15/2019	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283501-FR-8	FR	2/14/2017	EP17156019A	EP3211212	5/15/2019	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283501-GB-10	GB	2/14/2017	EP17156019A	EP3211212	5/15/2019	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283501-IN-5	IN	2/8/2017	IN201744004629A	IN201744004629	8/18/2017	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283501-JP-2	JP	2/7/2017	JP2017020009A	JP7019296	2/15/2022	Start-up/stop system for vehicles, and the method of producing it	Dolby Intellectual Property Licensing, LLC	Active
283501-KR-3	KR	2/10/2017	KR20170018482A	KR102324581	11/12/2021	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active

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283501-US-1	US	2/17/2016	US15/045754	US10550816	2/4/2020	Start/stop system for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-CN-2	CN	4/25/2017	CN201710280077A	CN107364350	11/21/2017	Integration charger and its manufacture method for vehicle	Dolby Intellectual Property Licensing, LLC	Active
283516-DE-9	DE	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-EP-3	EP	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-FR-8	FR	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-GB-12	GB	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-IN-4	IN	4/17/2017	IN201744013461A	IN391206	3/11/2022	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-IT-10	IT	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-JP-5	JP	4/11/2017	JP2017077895A	JP6924061	8/25/2021	Traction system	Dolby Intellectual Property Licensing, LLC	Active
283516-KR-6	KR	4/18/2017	KR20170049653A	KR102370937	3/7/2022	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-NL-11	NL	4/24/2017	EP17167717A	EP3238979	12/6/2023	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283516-US-1	US	4/25/2016	US15/137679	US10507716	12/17/2019	Integrated charger for vehicles and method of making same	Dolby Intellectual Property Licensing, LLC	Active
283550-US-1	US	11/13/2015	US14/941376	US9774440	9/26/2017	Systems and methods for real-time operation of software radio frequency canceller	Dolby Intellectual Property Licensing, LLC	Active
283956-CN-3	CN	4/26/2017	CN201780026262A	CN109247052	10/23/2020	Power converter topology for energy storage systems	Dolby Intellectual Property Licensing, LLC	Active
283956-IN-5	IN	10/15/2018	IN201847039137A	IN201847039137	11/2/2018	Power converter topology for use in an energy storage system	Dolby Intellectual Property Licensing, LLC	Active
283956-US-1	US	4/26/2016	US15/138335	US9859808	1/2/2018	Power converter topology for use in an energy storage system	Dolby Intellectual Property Licensing, LLC	Active
284013-CN-1	CN	3/25/2016	CN201610176811A	CN107231087	7/2/2021	A range extender and a circuit protection method	Dolby Intellectual Property Licensing, LLC	Active
284013-JP-3	JP	3/24/2017	JP2017058490A	JP6971602	11/24/2021	Range extender and circuit protection method	Dolby Intellectual Property Licensing, LLC	Active
284013-US-2	US	3/24/2017	US15/468147	US10511162	12/17/2019	Range extender and circuit protection method	Dolby Intellectual Property Licensing, LLC	Active
284015-CN-1	CN	11/20/2015	CN201510809124A	CN106740155	7/16/2019	Distance increasing unit, energy management system and energy management method	Dolby Intellectual Property Licensing, LLC	Active
284050-AU-8	AU	3/14/2017	AU2017201729A	AU2017201729	12/20/2018	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-BR-3	BR	3/13/2017	BR102017004939A	BR102017004939	10/3/2017	agente farmacÃŠutico de administraÃ¦Ã/o tÃ"pica, mÃ‰todo de imageamento de proteÂna bÃsica e kit para fornecer um agente farmacÃŠutico	Dolby Intellectual Property Licensing, LLC	Active
284050-CA-2	CA	3/2/2017	CA2959662A	CA2959662	2/18/2020	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-CN-16	CN	3/14/2017	CN202110159761A	CN113018460	8/8/2023	Topical administration of neuromarker dyes for image guided surgery	Dolby Intellectual Property Licensing, LLC	Active

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284050-CN-5	CN	3/14/2017	CN201710149856A	CN107188868	6/18/2021	Partial administration of neuromarker dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-DE-13	DE	3/6/2017	EP17159417A	EP3225258	2/27/2019	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-EP-10	EP	3/6/2017	EP17159417A	EP3225258	2/27/2019	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-FR-12	FR	3/6/2017	EP17159417A	EP3225258	2/27/2019	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-GB-14	GB	3/6/2017	EP17159417A	EP3225258	2/27/2019	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-JP-7	JP	3/1/2017	JP2017037857A	JP7099803	7/12/2022	The local application of the nerve label pigment for an image induction surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-KR-9	KR	3/14/2017	KR20170031920A	KR101953011	2/27/2019	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-MX-4	MX	3/13/2017	MX2017003295A	MX2017003295	8/15/2018	Topical application of nerve labeling dyes for image-guided surgery.	Dolby Intellectual Property Licensing, LLC	Active
284050-RU-11	RU	3/13/2017	RU2017108177A	RU2699571	9/6/2019	Locally administered pharmaceutical agent, method for imaging by administration thereof and kit comprising thereof	Dolby Intellectual Property Licensing, LLC	Active
284050-US-1	US	3/14/2016	US15/069198	US10744212	8/18/2020	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-US-15	US	8/14/2020	US16/994127	US11730830	8/22/2023	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284050-US-17	US	7/11/2023	US18/350268	US20230364269	11/16/2023	Topical application of nerve labeling dyes for image-guided surgery	Dolby Intellectual Property Licensing, LLC	Active
284148-BR-6	BR	10/4/2016	BR102016023076A	BR102016023076	11/1/2022	Lamination of stator, assembly and electric machine	Dolby Intellectual Property Licensing, LLC	Active
284148-CN-3	CN	9/30/2016	CN201610866282A	CN106849403	7/14/2020	Motor stator lamination with two-phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-DE-9	DE	10/4/2016	EP16192202A	EP3154154	2/27/2019	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-EP-5	EP	10/4/2016	EP16192202A	EP3154154	2/27/2019	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-FR-8	FR	10/4/2016	EP16192202A	EP3154154	2/27/2019	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-GB-10	GB	10/4/2016	EP16192202A	EP3154154	2/27/2019	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-IN-7	IN	10/3/2016	IN201641033756A	IN438199	7/14/2023	Electric machine stator lamination with dual phase	Dolby Intellectual Property Licensing, LLC	Active
284148-JP-2	JP	9/27/2016	JP2016187673A	JP7102092	7/19/2022	Generator stator lamination provided with the two-phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-KR-4	KR	10/4/2016	KR20160127593A	KR102579577	9/15/2023	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284148-US-1	US	10/5/2015	US14/874583	US10396615	8/27/2019	Electric machine stator lamination with dual phase magnetic material	Dolby Intellectual Property Licensing, LLC	Active
284633-US-1	US	10/23/2015	US14/921449	US11152648	10/19/2021	Electrode compositions and articles, and related processes	Dolby Intellectual Property Licensing, LLC	Active
284800-US-1	US	2/1/2016	US15/011755	US9722493	8/1/2017	Power converter for ground-referenced system and floating system	Dolby Intellectual Property Licensing, LLC	Active

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285532-CN-2	CN	12/12/2017	CN201711317198A	CN108232339	12/9/2022	Processing method for electrochemical cell	Dolby Intellectual Property Licensing, LLC	Active
285532-DE-6	DE	12/1/2017	EP17204988A	EP3333964	3/3/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285532-EP-3	EP	12/1/2017	EP17204988A	EP3333964	3/3/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285532-FR-5	FR	12/1/2017	EP17204988A	EP3333964	3/3/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285532-GB-7	GB	12/1/2017	EP17204988A	EP3333964	3/3/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285532-IN-1	IN	12/12/2016	IN201641042297A	IN379732	10/29/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285532-US-4	US	12/12/2017	US15/838419	US11211642	12/28/2021	Treatment processes for electrochemical cells	Dolby Intellectual Property Licensing, LLC	Active
285698-CN-1	CN	5/4/2016	CN201610290259A	CN107346765	11/26/2019	Bridge arm circuit package assembling and full-bridge circuit package assembling	Dolby Intellectual Property Licensing, LLC	Active
285698-IN-3	IN	5/3/2017	IN201744015669A	IN201744015669	11/10/2017	Bridge leg circuit assembly and full-bridge circuit assembly	Dolby Intellectual Property Licensing, LLC	Active
285698-JP-4	JP	4/21/2017	JP2017084102A	JP7012453	1/28/2022	A bridge leg circuit assembly and a full bridge circuit assembly	Dolby Intellectual Property Licensing, LLC	Active
285698-KR-5	KR	4/25/2017	KR20170052925A	KR102339135	12/16/2021	Bridge leg circuit assembly and full-bridge circuit assembly	Dolby Intellectual Property Licensing, LLC	Active
285698-US-6	US	5/4/2017	US15/586646	US10230365	3/12/2019	Bridge leg circuit assembly and full-bridge circuit assembly	Dolby Intellectual Property Licensing, LLC	Active
285699-DE-7	DE	8/4/2017	EP17184847A	EP3282533	10/18/2023	Solid state circuit breaker and motor driving system	Dolby Intellectual Property Licensing, LLC	Active
285699-EP-6	EP	8/4/2017	EP17184847A	EP3282533	10/18/2023	Solid state circuit breaker and motor driving system	Dolby Intellectual Property Licensing, LLC	Active
285699-IN-5	IN	8/11/2017	IN201744028604A	IN409294	10/21/2022	Solid state circuit breaker and motor driving system	Dolby Intellectual Property Licensing, LLC	Active
285699-JP-3	JP	8/7/2017	JP2017152105A	JP6976100	12/8/2021	A solid-state circuit circuit breaker and a motor drive system	Dolby Intellectual Property Licensing, LLC	Active
285699-KR-4	KR	8/11/2017	KR20170102582A	KR102338061	12/13/2021	Solid state circuit breaker and motor driving system	Dolby Intellectual Property Licensing, LLC	Active
285699-US-2	US	8/4/2017	US15/669384	US10591547	3/17/2020	Solid state circuit breaker and motor driving system	Dolby Intellectual Property Licensing, LLC	Active
285938-CN-3	CN	6/5/2017	CN201710416430A	CN107465345	2/26/2021	System and method for dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285938-DE-7	DE	6/2/2017	EP17174155A	EP3255772	12/14/2022	System and method for a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285938-EP-4	EP	6/2/2017	EP17174155A	EP3255772	12/14/2022	System and method for a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285938-IN-6	IN	6/5/2017	IN201744019730A	IN455192	10/6/2023	System and method for a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285938-JP-2	JP	6/2/2017	JP2017110364A	JP7005178	1/21/2022	The system and method of a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285938-KR-5	KR	6/1/2017	KR20170068500A	KR102368860	3/2/2022	System and method for a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active

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285938-US-1	US	6/6/2016	US15/174042	US9960687	5/1/2018	System and method for a dc/dc converter	Dolby Intellectual Property Licensing, LLC	Active
285974-US-1	US	12/16/2015	US14/970670	US9634585	4/25/2017	Control method for reducing torque ripple in an electrical machine	Dolby Intellectual Property Licensing, LLC	Active
285990-CN-10	CN	2/3/2017	CN202211186116A	CN115588968	1/10/2023	System and method for protecting a wireless power transmission system	Dolby Intellectual Property Licensing, LLC	Active
285990-DE-7	DE	1/30/2017	EP17153732A	EP3203605	1/8/2020	System and method for protecting a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
285990-EP-6	EP	1/30/2017	EP17153732A	EP3203605	1/8/2020	System and method for protecting a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
285990-IN-1	IN	2/3/2016	IN201641003928A	IN377243	9/24/2021	System and method for protecting a wireless power	Dolby Intellectual Property Licensing, LLC	Active
285990-JP-11	JP	5/31/2023	JP2023089949A	JP2023110003A	8/8/2023		Dolby Intellectual Property Licensing, LLC	Active
285990-JP-5	JP	1/30/2017	JP2017013768A	JP7005147	1/21/2022	The system and method for protecting a wireless electric power transmission system	Dolby Intellectual Property Licensing, LLC	Active
285990-JP-9	JP	1/5/2022	JP2022000705A	JP7289939	6/12/2023	System and method for protecting wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
285990-SG-3	SG	1/25/2017	SG10201700633QA	SG10201700633Q	9/28/2017	System and method for protecting a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
285990-US-2	US	1/27/2017	US15/417246	US10700550	6/30/2020	System and method for protecting a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
285990-US-8	US	5/21/2020	US16/880712	US11955805	4/9/2024	System and method for protecting a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
287419-US-2	US	7/22/2016	US15/217493	US10132743	11/20/2018	Fixed optics photo-thermal spectroscopy reader and method of use	Dolby Intellectual Property Licensing, LLC	Active
287473-US-1	US	4/15/2016	US15/130401	US10033910	7/24/2018	Synchronous sampling methods for infrared cameras	Dolby Intellectual Property Licensing, LLC	Active
309222-US-2	US	4/27/2011	US13/095387	US8749104	6/10/2014	Rotating electric machine, especially synchronous permanent magnet machine	Dolby Intellectual Property Licensing, LLC	Active
313124-CN-4	CN	6/27/2017	CN201780040548A	CN109643891	2/14/2020	System and method for fault interruption using mems switches	Dolby Intellectual Property Licensing, LLC	Active
313124-DE-7	DE	6/27/2017	EP17737963A	EP3479449	7/29/2020	System and method for fault interruption with mems switches	Dolby Intellectual Property Licensing, LLC	Active
313124-EP-6	EP	6/27/2017	EP17737963A	EP3479449	7/29/2020	System and method for fault interruption with mems switches	Dolby Intellectual Property Licensing, LLC	Active
313124-GB-8	GB	6/27/2017	EP17737963A	EP3479449	7/29/2020	System and method for fault interruption with mems switches	Dolby Intellectual Property Licensing, LLC	Active
313124-JP-5	JP	6/27/2017	JP2018567266A	JP7018904	2/14/2022	The system and method for the failure interruption using a mems switch	Dolby Intellectual Property Licensing, LLC	Active
313124-TW-3	TW	6/26/2017	TW106121294A	TWI742099	10/11/2021	System and method for fault interruption with mems switches	Dolby Intellectual Property Licensing, LLC	Active
313124-US-1	US	6/29/2016	US15/197221	US10211622	2/19/2019	System and method for fault interruption with mems switches	Dolby Intellectual Property Licensing, LLC	Active
313847-US-1	US	1/9/2017	US15/401333	US10983119	4/20/2021	Device for rapid diagnostic tests to detect antigens with improved sensitivity	Joint ownership - Dolby Intellectual Property Licensing, LLC and Tokitae LLC	Active
314005-CN-1	CN	4/20/2017	CN201710260910A	CN108736791	3/29/2022	Vehicle and control method and system thereof	Dolby Intellectual Property Licensing, LLC	Active

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314005-DE-6	DE	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-EP-3	EP	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-ES-8	ES	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-FR-5	FR	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-GB-9	GB	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-IT-7	IT	4/17/2018	EP18787396A	EP3612847	8/2/2023	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314005-US-4	US	4/17/2018	US16/605842	US11201567	12/14/2021	Vehicle and control method thereof and system	Dolby Intellectual Property Licensing, LLC	Active
314147-CN-4	CN	10/30/2017	CN201711039368A	CN108023412	7/28/2023	System and method for actively controlling output voltage of wireless power transmission system	Dolby Intellectual Property Licensing, LLC	Active
314147-CN-6	CN	10/30/2017	CN202310833729A	CN116961252	10/27/2023	System and method for actively controlling output voltage of wireless power transmission system	Dolby Intellectual Property Licensing, LLC	Active
314147-IN-1	IN	10/28/2016	IN201641037044A	IN368648	6/11/2021	System and method for actively controlling output voltage	Dolby Intellectual Property Licensing, LLC	Active
314147-SG-3	SG	10/9/2017	SG10201708314TA	SG10201708314T	5/30/2018	System and method for actively controlling output voltage of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
314147-US-2	US	10/26/2017	US15/794524	US10411516	9/10/2019	System and method for actively controlling output voltage of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
314147-US-5	US	7/31/2019	US16/528306	US11075545	7/27/2021	System and method for actively controlling output voltage of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
314571-US-1	US	8/23/2017	US15/684695	US10679338	6/9/2020	Three-dimensional modeling of an object	Dolby Intellectual Property Licensing, LLC	Active
314571-US-3	US	4/29/2020	US16/862107	US11145051	10/12/2021	Three-dimensional modeling of an object	Dolby Intellectual Property Licensing, LLC	Active
314858-CN-3	CN	11/20/2017	CN201780076924A	CN110072728	7/7/2020	System and method for leakage current and fault location detection for electric vehicle dc power supply circuits	Dolby Intellectual Property Licensing, LLC	Active
314858-DE-3	DE	11/20/2017	EP17880066A	EP3554885	6/28/2023	System and method for leakage current and fault location detection in electric vehicle dc power circuites	Dolby Intellectual Property Licensing, LLC	Active
314858-EP-4	EP	11/20/2017	EP17880066A	EP3554885	6/28/2023	System and method for leakage current and fault location detection in electric vehicle dc power circuites	Dolby Intellectual Property Licensing, LLC	Active
314858-US-1	US	12/14/2016	US15/379126	US10168372	1/1/2019	System and method for leakage current and fault location detection in electric vehicle dc power circuits	Dolby Intellectual Property Licensing, LLC	Active
314859-CN-3	CN	10/20/2017	CN201780076925A	CN110100184	8/6/2021	Dc leakage current detector and operation method thereof for leakage current detector in dc power supply circuit	Dolby Intellectual Property Licensing, LLC	Active
314859-EP-4	EP	10/20/2017	EP17794516A	EP3555640	7/3/2024	Dc leakage current detector and method of operation thereof for leakage current detector in dc power circuits	Dolby Intellectual Property Licensing, LLC	Active

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314859-US-1	US	12/14/2016	US15/379160	US10203363	2/12/2019	Dc leakage current detector and method of operation thereof for leakage current detection in dc power circuits	Dolby Intellectual Property Licensing, LLC	Active
315022-US-1	US	12/15/2016	US15/381090	US10393492	8/27/2019	Digital wireless feeler gauge	Dolby Intellectual Property Licensing, LLC	Active
315117-IN-1	IN	12/15/2016	IN201641042702A	IN451354	9/15/2023	Charging pads and methods for charging receiver devices	Dolby Intellectual Property Licensing, LLC	Active
315117-US-3	US	10/28/2017	US16/469525	US11081900	8/3/2021	Charging pads and methods for charging receiver devices having different frequency standards	Dolby Intellectual Property Licensing, LLC	Active
315233-US-2	US	10/27/2017	US15/796379	US10740651	8/11/2020	Methods of systems of generating virtual multi-dimensional models using image analysis	Dolby Intellectual Property Licensing, LLC	Active
315343A-US-1	US	1/16/2017	US15/406907	US10390766	8/27/2019	System and method for predicting an excitation pattern of a deep brain stimulation	Dolby Intellectual Property Licensing, LLC	Active
315343-US-1	US	1/16/2017	US15/406895	US10624588	4/21/2020	System and method for predicting an excitation pattern of a deep brain stimulation	Dolby Intellectual Property Licensing, LLC	Active
315659-IN-1	IN	12/15/2016	IN201641042699A	IN461484	10/27/2023	A charging pad and a method for charging one or more	Dolby Intellectual Property Licensing, LLC	Active
315659-US-3	US	10/27/2017	US16/469538	US11223240	1/11/2022	Charging pad and a method for charging one or more receiver devices	Dolby Intellectual Property Licensing, LLC	Active
315659-US-4	US	12/3/2021	US17/541891	US11798737	10/24/2023	Charging pad and a method for charging one or more receiver devices	Dolby Intellectual Property Licensing, LLC	Active
315659-US-5	US	10/23/2023	US18/492358	US20240047133	2/8/2024	Charging pad and a method for charging one or more receiver devices	Dolby Intellectual Property Licensing, LLC	Active
315851-CN-1	CN	1/25/2017	CN201710061052A	CN108347167	7/13/2021	System and method for soft switching dc-dc converter	Dolby Intellectual Property Licensing, LLC	Active
315851-IN-4	IN	1/23/2018	IN201844002681A	IN201844002681	7/27/2018	Systems and methods for a soft switching dc-dc converter	Dolby Intellectual Property Licensing, LLC	Active
315851-JP-3	JP	1/12/2018	JP2018003029A	JP7045859	4/1/2022	The system and method for a soft switching dc-dc converter	Dolby Intellectual Property Licensing, LLC	Active
315851-KR-5	KR	1/23/2018	KR20180008307A	KR102400368	5/23/2022	Systems and methods for a soft switching dc-dc converter	Dolby Intellectual Property Licensing, LLC	Active
315851-US-2	US	12/7/2017	US15/834304	US11784600	10/10/2023	Systems and methods for a soft switching dc-dc converter	Dolby Intellectual Property Licensing, LLC	Active
315892-US-1	US	12/20/2017	US15/848301	US10837962	11/17/2020	Method and associated device for rapid detection of target biomolecules with enhanced sensitivity	Dolby Intellectual Property Licensing, LLC	Active
315892-US-2	US	11/5/2020	US17/090383	US11714084	8/1/2023	Method and associated device for rapid detection of target biomolecules with enhanced sensitivity	Dolby Intellectual Property Licensing, LLC	Active
316115-CN-3	CN	1/3/2018	CN201810004638A	CN108336987	3/9/2021	System and method for gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
316115-DE-8	DE	12/14/2017	EP17207351A	EP3343768	2/24/2021	Systems and methods for a gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
316115-EP-2	EP	12/14/2017	EP17207351A	EP3343768	2/24/2021	Systems and methods for a gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
316115-IN-6	IN	12/28/2017	IN201744047051A	IN201744047051	7/6/2018	Systems and methods for a gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
316115-JP-5	JP	12/21/2017	JP2017244570A	JP7250421	4/3/2023	System for gate drive circuit and method	Dolby Intellectual Property Licensing, LLC	Active
316115-KR-7	KR	1/2/2018	KR20180000333A	KR102398189	5/17/2022	Systems and methods for a gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active

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316115-US-1	US	1/3/2017	US15/397443	US10374591	8/6/2019	Systems and methods for a gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
316364-US-1	US	2/1/2017	US15/421915	US10594030	3/17/2020	True time delay module and beam former having plural delay lines selectively connected by plural switching elements including one or more intermediate switching element	Dolby Intellectual Property Licensing, LLC	Active
316496-US-1	US	12/6/2016	US15/370736	US10216983	2/26/2019	Techniques for assessing group level cognitive states	Dolby Intellectual Property Licensing, LLC	Active
316767-CN-3	CN	2/6/2018	CN201880015264A	CN110382286	7/3/2020	Drive system for reducing dc link current ripple and method of operating the same	Dolby Intellectual Property Licensing, LLC	Active
316767-EP-4	EP	2/6/2018	EP18761836A	EP3589514	1/8/2020	Drive system and method of operation thereof for reducing dc link current ripple	Dolby Intellectual Property Licensing, LLC	Active
316767-JP-5	JP	2/6/2018	JP2019547271A	JP7051886	4/11/2022	The drive system and its action method for reducing dc link electric current ripple	Dolby Intellectual Property Licensing, LLC	Active
316767-KR-6	KR	2/6/2018	KR20197028942A	KR102485836	1/5/2023	Drive system and method of operation of drive system to reduce dc link current ripple	Dolby Intellectual Property Licensing, LLC	Active
316767-US-1	US	3/3/2017	US15/449609	US10425032	9/24/2019	Drive system and method of operation thereof for reducing dc link current ripple	Dolby Intellectual Property Licensing, LLC	Active
316767-US-7	US	8/9/2019	US16/536431	US11342876	5/24/2022	Drive system and method of operation thereof for reducing dc link current ripple	Dolby Intellectual Property Licensing, LLC	Active
316772-CN-3	CN	3/16/2018	CN201880031728A	CN110663158	8/2/2022	Double magnetic phase material ring for alternating current motor	Dolby Intellectual Property Licensing, LLC	Active
316772-EP-4	EP	3/16/2018	EP18803259A	EP3625874	3/25/2020	Dual magnetic phase material rings for ac electric machines	Dolby Intellectual Property Licensing, LLC	Active
316772-US-1	US	5/18/2017	US15/598408	US10749383	8/18/2020	Dual magnetic phase material rings for ac electric machines	Dolby Intellectual Property Licensing, LLC	Active
317047-CN-6	CN	10/17/2017	CN201710969353A	CN107959446	11/30/2021	System and method for motor senderless control using magnetic alignment features	Dolby Intellectual Property Licensing, LLC	Active
317047-DE-8	DE	10/12/2017	EP17196147A	EP3309954	1/17/2024	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317047-EP-5	EP	10/12/2017	EP17196147A	EP3309954	1/17/2024	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317047-IN-4	IN	10/10/2017	IN201744035888A	IN469106	11/17/2023	System and method for sensorless control of electric	Dolby Intellectual Property Licensing, LLC	Active
317047-JP-2	JP	10/3/2017	JP2017193158A	JP7271079	5/11/2023	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317047-KR-3	KR	10/16/2017	KR20170134136A	KR101993524	6/26/2019	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317047-US-1	US	10/17/2016	US15/295830	US9948224	4/17/2018	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317047-US-7	US	10/16/2017	US15/784696	US10224851	3/5/2019	System and method for sensorless control of electric machines using magnetic alignment signatures	Dolby Intellectual Property Licensing, LLC	Active
317124-US-1	US	12/6/2016	US15/370746	US10445565	10/15/2019	Crowd analytics via one shot learning	Dolby Intellectual Property Licensing, LLC	Active
317318-US-1	US	9/13/2017	US15/703835	US10423820	9/24/2019	Systems and methods for automatic generation of training sets for machine interpretation of images	Dolby Intellectual Property Licensing, LLC	Active
317707-CN-4	CN	8/9/2018	CN201880058996A	CN111065710	4/14/2023	Green light emitting phosphor and device thereof	Dolby Intellectual Property Licensing, LLC	Active

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317707-EP-5	EP	8/9/2018	EP18857541A	EP3684885	7/29/2020	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
317707-JP-6	JP	8/9/2018	JP2020515977A	JP7257391B2	4/13/2023		Dolby Intellectual Property Licensing, LLC	Active
317707-KR-7	KR	8/9/2018	KR20207011204A	KR10267114 4	5/30/2024	Green phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
317707-TW-10	TW	9/6/2018	TW110123430A	TWI755340	2/11/2022	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
317707-TW-2	TW	9/6/2018	TW107131340A	TWI732133	7/1/2021	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
317707-US-1	US	9/20/2017	US15/710780	US10720554	7/21/2020	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
317707-US-9	US	5/22/2020	US16/882133	US11094856	8/17/2021	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
318182-CN-3	CN	8/22/2018	CN201880054159A	CN11099905 5	12/1/2020	System and method for fast current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-DE-8	DE	8/22/2018	EP18762742A	EP3673573	5/19/2021	System and method for rapid current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-EP-4	EP	8/22/2018	EP18762742A	EP3673573	5/19/2021	System and method for rapid current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-FR-7	FR	8/22/2018	EP18762742A	EP3673573	5/19/2021	System and method for rapid current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-GB-9	GB	8/22/2018	EP18762742A	EP3673573	5/19/2021	System and method for rapid current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-JP-5	JP	8/22/2018	JP2020510092A	JP7209447	1/20/2023	Systems and methods for fast current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-KR-6	KR	8/22/2018	KR20207007968A	KR10258126 6	9/21/2023	Systems and methods for fast current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318182-US-1	US	8/22/2017	US15/682940	US10491096	11/26/2019	System and method for rapid current sensing and transistor timing control	Dolby Intellectual Property Licensing, LLC	Active
318542-CN-2	CN	8/31/2017	CN201780094322A	CN11103231 9	3/15/2022	Encoding volume data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-DE-9	DE	8/31/2017	EP17923384A	EP3676065	4/12/2023	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-EP-3	EP	8/31/2017	EP17923384A	EP3676065	4/12/2023	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-FR-8	FR	8/31/2017	EP17923384A	EP3676065	4/12/2023	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-GB-10	GB	8/31/2017	EP17923384A	EP3676065	4/12/2023	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-JP-4	JP	8/31/2017	JP2020511468A	JP7032518	3/8/2022	The encoding of the volume data for supporting reliable transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-KR-5	KR	8/31/2017	KR20207009008A	KR10238609 6	4/12/2022	Encoding of volumetric data to support trusted transactional delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-US-6	US	8/31/2017	US16/641155	US11077617	8/3/2021	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active
318542-US-7	US	6/30/2021	US17/364012	US11623407	4/11/2023	Encoding volumetric data to support trusted transaction delivery	Dolby Intellectual Property Licensing, LLC	Active

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318543-CN-2	CN	8/31/2017	CN201780094076A	CN111033405	8/22/2023	Intellectual property exchange ecological system for increasing material production	Dolby Intellectual Property Licensing, LLC	Active
318543-EP-3	EP	8/31/2017	EP17923191A	EP3676676	7/8/2020	Intellectual property exchange ecosystem for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318543-JP-4	JP	8/31/2017	JP2020511469A	JP7077399	5/30/2022	The intellectual-property replacement ecosystem for lamination-modeling	Dolby Intellectual Property Licensing, LLC	Active
318543-KR-5	KR	8/31/2017	KR20207009014A	KR102573977	9/1/2023	Ecosystem of intellectual property exchange for further production	Dolby Intellectual Property Licensing, LLC	Active
318543-KR-8	KR	8/31/2017	KR20237029458A	KR20230128593	9/5/2023	Intellectual property exchange ecosystem for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318543-US-6	US	8/31/2017	US16/641161	US11468528	10/11/2022	Intellectual property exchange ecosystem for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318543-US-7	US	10/3/2022	US17/937615	US11948215	4/2/2024	Intellectual property exchange ecosystem for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318580-CN-2	CN	8/31/2017	CN201780094410A	CN111448069	2/25/2022	Distribution of customized engineering model for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318580-EP-3	EP	8/31/2017	EP17923537A	EP3676719	7/8/2020	Distribution of customized engineering models for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318580-JP-4	JP	8/31/2017	JP2020511446A	JP7105871	7/25/2022	Distribution of the engineering model with which it customized for lamination-modeling	Dolby Intellectual Property Licensing, LLC	Active
318580-KR-5	KR	8/31/2017	KR20207009100A	KR102417932	7/5/2022	Dispersion of customized engineering models for further fabrication	Dolby Intellectual Property Licensing, LLC	Active
318580-US-6	US	8/31/2017	US16/641167	US11453170	9/27/2022	Distribution of customized engineering models for additive manufacturing	Dolby Intellectual Property Licensing, LLC	Active
318587-CN-2	CN	8/31/2017	CN201780094368A	CN111095315	5/7/2024	Collaborative transaction information processing for block chain enabled supply chain	Dolby Intellectual Property Licensing, LLC	Active
318587-EP-3	EP	8/31/2017	EP17923052A	EP3676768	7/8/2020	Blockchain enabled collaborative transaction information processing for a supply chain	Dolby Intellectual Property Licensing, LLC	Active
318587-JP-4	JP	8/31/2017	JP2020511997A	JP7257386B2	4/13/2023		Dolby Intellectual Property Licensing, LLC	Active
318587-KR-7	KR	8/31/2017	KR20237015666A	KR20230069258	5/18/2023	Blockchain enabled collaborative transaction information processing for a supply chain	Dolby Intellectual Property Licensing, LLC	Active
318587-US-6	US	8/31/2017	US16/641188	US11783346	10/10/2023	Blockchain enabled collaborative transaction information processing for a supply chain	Dolby Intellectual Property Licensing, LLC	Active
318638-US-1	US	12/20/2017	US15/848302	US10830760	11/10/2020	Device for rapid detection of tuberculosis-lipoarabinomannan (tb-lam) with enhanced sensitivity	Joint ownership - Dolby Intellectual Property Licensing, LLC and Tokitae LLC	Active
318638-US-2	US	11/6/2020	US17/091501	US11726078	8/15/2023	Device for rapid detection of tuberculosis-lipoarabinomannan (tb-lam) with enhanced sensitivity	Joint ownership - Dolby Intellectual Property Licensing, LLC and Tokitae LLC	Active
318738A-US-1	US	10/20/2017	US15/789000	US11305663	4/19/2022	Energy efficient hands-free electric vehicle charger for autonomous vehicles in uncontrolled environments	Dolby Intellectual Property Licensing, LLC	Active
318738-US-2	US	10/20/2017	US15/788971	US10675982	6/9/2020	System and method for inductive charging with improved efficiency	Dolby Intellectual Property Licensing, LLC	Active
318763-US-2	US	1/2/2019	US16/238237	US10862402	12/8/2020	System and method for power converter including inverter, resonant circuit, and voltage multiplier	Dolby Intellectual Property Licensing, LLC	Active
319133-US-1	US	8/21/2018	US16/106688	US10820404	10/27/2020	Neutron generator with a rotating target in a vacuum chamber	Dolby Intellectual Property Licensing, LLC	Active

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319318-CN-3	CN	4/19/2018	CN201880034568A	CN110663157	2/13/2024	Power transmission device and related method	Dolby Intellectual Property Licensing, LLC	Active
319318-IN-1	IN	5/26/2017	IN201741018544A	IN201741018544	11/30/2018	A power transfer device and an associated method thereof	Dolby Intellectual Property Licensing, LLC	Active
319318-US-4	US	4/19/2018	US16/616395	US10998822	5/4/2021	Power transfer device with a plurality of converters	Dolby Intellectual Property Licensing, LLC	Active
319319-CN-3	CN	5/21/2018	CN201880035230A	CN110679060	5/24/2024	Transmission assembly for universal wireless charging device and method thereof	Dolby Intellectual Property Licensing, LLC	Active
319319-IN-1	IN	5/30/2017	IN201741019042A	IN407617	9/30/2022	Transmitting assembly for a universal wireless charging	Dolby Intellectual Property Licensing, LLC	Active
319319-US-4	US	5/21/2018	US16/616409	US11689056	6/27/2023	Transmitting assembly for a universal wireless charging device and a method thereof	Dolby Intellectual Property Licensing, LLC	Active
319319-US-5	US	6/16/2023	US18/336335	US20230327491	10/12/2023	Transmitting assembly for a universal wireless charging device and a method thereof	Dolby Intellectual Property Licensing, LLC	Active
319335-CN-4	CN	6/11/2018	CN201880044663A	CN110831706	2/21/2020	Article for high temperature operations and related methods	Dolby Intellectual Property Licensing, LLC	Active
319335-EP-5	EP	6/11/2018	EP18828354A	EP3648902	5/13/2020	Articles for high temperature service and related method	Dolby Intellectual Property Licensing, LLC	Active
319335-JP-6	JP	6/11/2018	JP2020500180A	JP7158120	10/21/2022	High temperature articles and related methods	Dolby Intellectual Property Licensing, LLC	Active
319335-KR-7	KR	6/11/2018	KR1020207003486A	KR102485843	1/5/2023	Methods related to articles for high temperature service	Dolby Intellectual Property Licensing, LLC	Active
319335-US-2	US	2/7/2018	US15/891241	US11155721	10/26/2021	Articles for high temperature service and related method	Dolby Intellectual Property Licensing, LLC	Active
319335-US-8	US	9/21/2021	US17/480889	US11851581	12/26/2023	Articles for high temperature service and related method	Dolby Intellectual Property Licensing, LLC	Active
319620-CN-3	CN	8/21/2018	CN201880066411A	CN111201668	3/26/2021	True delay beamformer module and method of manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
319620-DE-7	DE	8/21/2018	EP18867077A	EP3695460	10/4/2023	True time delay beam former module and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
319620-EP-4	EP	8/21/2018	EP18867077A	EP3695460	10/4/2023	True time delay beam former module and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
319620-JP-5	JP	8/21/2018	JP2020520471A	JP7217746	2/3/2023	Real-time delay beamformer module and its fabrication method	Dolby Intellectual Property Licensing, LLC	Active
319620-KR-6	KR	8/21/2018	KR1020207013539A	KR102000057090	5/25/2020	Real-time delay beam former module and manufacturing method	Dolby Intellectual Property Licensing, LLC	Abandoned
319620-US-1	US	10/13/2017	US15/782991	US10784576	9/22/2020	True time delay beam former module and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
319621-CN-3	CN	7/5/2018	CN201880065985A	CN111201724	5/7/2021	True delay beam former and operation method	Dolby Intellectual Property Licensing, LLC	Active
319621-DE-8	DE	7/5/2018	EP18868697A	EP3695528	8/30/2023	True time delay beam former and method of operation	Dolby Intellectual Property Licensing, LLC	Active
319621-EP-4	EP	7/5/2018	EP18868697A	EP3695528	8/30/2023	True time delay beam former and method of operation	Dolby Intellectual Property Licensing, LLC	Active
319621-FR-7	FR	7/5/2018	EP18868697A	EP3695528	8/30/2023	True time delay beam former and method of operation	Dolby Intellectual Property Licensing, LLC	Active
319621-GB-9	GB	7/5/2018	EP18868697A	EP3695528	8/30/2023	True time delay beam former and method of operation	Dolby Intellectual Property Licensing, LLC	Active

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319621-JP-5	JP	7/5/2018	JP2020520641A	JP7212684	1/25/2023	Real time delay beam former and how it works	Dolby Intellectual Property Licensing, LLC	Active
319621-KR-6	KR	7/5/2018	KR20207013598A	KR102514959	3/27/2023	Real-time delayed beamformer and its operating method	Dolby Intellectual Property Licensing, LLC	Active
319621-US-1	US	10/13/2017	US15/782969	US10211902	2/19/2019	True time delay beam former and method of operation	Dolby Intellectual Property Licensing, LLC	Active
319639-CN-3	CN	8/27/2018	CN201880066919A	CN111226347	5/7/2021	High impedance rf mems transmission device and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
319639-EP-4	EP	8/27/2018	EP18869267A	EP3698429	8/26/2020	High impedance rf mems transmission devices and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
319639-JP-5	JP	8/27/2018	JP2020521589A	JP7217748	2/3/2023	High impedance rf mems transmission element and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
319639-KR-6	KR	8/27/2018	KR20207013786A	KR102562909	8/2/2023	High-impedance rgb transmission devices and method for manufacturing the same	Dolby Intellectual Property Licensing, LLC	Active
319639-US-1	US	10/18/2017	US15/786696	US10326200	6/18/2019	High impedance rf mems transmission devices and method of making the same	Dolby Intellectual Property Licensing, LLC	Active
319927-CN-3	CN	9/14/2018	CN201880068518A	CN111247736	11/21/2023	System and method for preventing demagnetization of permanent magnet in motor	Dolby Intellectual Property Licensing, LLC	Active
319927-EP-4	EP	9/14/2018	EP18870760A	EP3701628	9/2/2020	System and method for preventing permanent magnet demagnetization in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
319927-JP-5	JP	9/14/2018	JP2020542529A	JP7235756	3/8/2023	Systems and methods to prevent demagnetization of permanent magnets in electromechanical machines	Dolby Intellectual Property Licensing, LLC	Active
319927-KR-7	KR	9/14/2018	KR20247002150A	KR20240012617	1/29/2024	System and method for preventing permanent magnet demagnetization in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
319927-US-1	US	10/23/2017	US15/790251	US10230321	3/12/2019	System and method for preventing permanent magnet demagnetization in electrical machines	Dolby Intellectual Property Licensing, LLC	Active
320002-CN-3	CN	11/13/2018	CN201880073502A	CN111344690	3/28/2023	Layered data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-DE-10	DE	11/13/2018	EP18880028A	EP3710950	5/31/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-EP-4	EP	11/13/2018	EP18880028A	EP3710950	5/31/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-FR-9	FR	11/13/2018	EP18880028A	EP3710950	5/31/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-GB-11	GB	11/13/2018	EP18880028A	EP3710950	5/31/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-JP-5	JP	11/13/2018	JP2020526118A	JP7312746	7/21/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-KR-6	KR	11/13/2018	KR20207016814A	KR102566881	8/11/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-US-1	US	11/14/2017	US15/812003	US10938950	3/2/2021	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-US-12	US	5/8/2023	US18/144493	US20230275978	8/31/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-US-7	US	2/4/2021	US17/167854	US11323544	5/3/2022	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active
320002-US-8	US	4/22/2022	US17/727342	US11683397	6/20/2023	Hierarchical data exchange management system	Dolby Intellectual Property Licensing, LLC	Active

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320128-DE-8	DE	4/23/2018	EP18791526A	EP3615779	3/23/2022	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-EP-3	EP	4/23/2018	EP18791526A	EP3615779	3/23/2022	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-FR-7	FR	4/23/2018	EP18791526A	EP3615779	3/23/2022	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-GB-9	GB	4/23/2018	EP18791526A	EP3615779	3/23/2022	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-US-11	US	1/5/2022	US17/568901	US11846230	12/19/2023	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-US-4	US	4/23/2018	US16/607189	US11168609	11/9/2021	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-US-5	US	10/28/2021	US17/512852	US11840957	12/12/2023	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320128-US-6	US	10/28/2021	US17/512942	US11815004	11/14/2023	Adaptive linear linked piston electric power generator	Dolby Intellectual Property Licensing, LLC	Active
320529-US-1	US	3/20/2020	US16/824917	US11373069	6/28/2022	Analogy engine for grounding and situational awareness	Dolby Intellectual Property Licensing, LLC	Active
320880-US-1	US	3/6/2018	US15/913434	US10488174	11/26/2019	Systems and methods for wearable voltage detection devices	Dolby Intellectual Property Licensing, LLC	Active
321104-US-1	US	8/27/2018	US16/113644	US10430517	10/1/2019	Apparatus, system and method for providing an agent that intelligently solves information technology issues	Dolby Intellectual Property Licensing, LLC	Active
322985-CN-3	CN	2/25/2019	CN201980016599A	CN111180192 7	5/14/2024	Industrial data validation using secure distributed ledgers	Dolby Intellectual Property Licensing, LLC	Active
322985-EP-4	EP	2/25/2019	EP19767806A	EP3766228	1/20/2021	Industrial data verification using secure, distributed ledger	Dolby Intellectual Property Licensing, LLC	Active
322985-IN-5	IN	9/18/2020	IN202017040449A	IN202017040449	1/1/2021	Industrial data verification using secure, distributed ledger	Dolby Intellectual Property Licensing, LLC	Active
322985-JP-6	JP	2/25/2019	JP2020547087A	JP7235764	3/8/2023	Industrial data validation using secure distributed ledger	Dolby Intellectual Property Licensing, LLC	Active
322985-US-1	US	3/16/2018	US15/923279	US11582042	2/14/2023	Industrial data verification using secure, distributed ledger	Dolby Intellectual Property Licensing, LLC	Active
323537-EP-3	EP	2/20/2019	EP19709270A	EP3759487	1/6/2021	System and method for electric pulse based activation of biological samples	Dolby Intellectual Property Licensing, LLC	Active
323537-JP-4	JP	2/20/2019	JP2020543970A	JP7382945	11/17/2023	Systems and methods for electrical pulse-based activation of biological samples	Dolby Intellectual Property Licensing, LLC	Active
323537-US-1	US	2/26/2018	US15/905463	US10968423	4/6/2021	System and method for electric pulse based activation of biological samples	Dolby Intellectual Property Licensing, LLC	Active
323953-US-1	US	2/20/2018	US15/899594	US10543361	1/28/2020	System and method for localization of deep brain stimulation electrode via magnetic resonance imaging	Dolby Intellectual Property Licensing, LLC	Active
324448-US-1	US	6/18/2018	US16/010809	US10970669	4/6/2021	Blockchain enabled transaction processing for an industrial asset supply chain	Dolby Intellectual Property Licensing, LLC	Active
324448-US-2	US	3/9/2021	US17/196764	US11829942	11/28/2023	Blockchain enabled transaction processing for an industrial asset supply chain	Dolby Intellectual Property Licensing, LLC	Active
324595-EP-3	EP	1/15/2020	EP20704169A	EP3914339	12/1/2021	System for predicting optimal deep brain stimulation parameters	Dolby Intellectual Property Licensing, LLC	Active
324595-US-1	US	1/22/2019	US16/253406	US10905882	2/2/2021	Systems and methods for predicting optimal deep brain stimulation parameters	Dolby Intellectual Property Licensing, LLC	Active

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324680-EP-3	EP	9/25/2019	EP19865020.5	EP3857693	8/4/2021	System and method for a magnetically coupled inductor boost and multiphase buck converter with split duty cycle	Dolby Intellectual Property Licensing, LLC	Active
324680-US-1	US	9/28/2018	US16/145406	US10574144	2/25/2020	System and method for a magnetically coupled inductor boost and multiphase buck converter with split duty cycle	Dolby Intellectual Property Licensing, LLC	Active
324828-US-2	US	11/27/2019	US16/698622	US11177759	11/16/2021	System and method for self-sensing of electric machines and reduction of noise and vibration associated therewith	Dolby Intellectual Property Licensing, LLC	Active
324845-CN-4	CN	3/22/2019	CN201980024991.A	CN111937272	11/13/2020	Receiver unit for wireless power transmission system	Dolby Intellectual Property Licensing, LLC	Active
324845-IN-1	IN	4/19/2018	IN201841014948.A	IN412011	11/25/2022	A receiver unit of a wireless power transfer system and	Dolby Intellectual Property Licensing, LLC	Active
324845-TW-2	TW	4/15/2019	TW108113031.A	TWI812700	8/21/2023	Receiver unit, method and integrated electronic component of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
324845-TW-8	TW	4/15/2019	TW112128545.A	TW202410599	3/1/2024		Dolby Intellectual Property Licensing, LLC	Active
324845-US-5	US	3/22/2019	US17/048429	US11316381	4/26/2022	Receiver unit of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
324845-US-6	US	4/21/2022	US17/726291	US11670449	6/6/2023	Receiver unit of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
324845-US-7	US	5/22/2023	US18/321434	US11955274	4/9/2024	Receiver unit of a wireless power transfer system	Dolby Intellectual Property Licensing, LLC	Active
325284-US-1	US	5/18/2018	US15/983668	US10673273	6/2/2020	Distributed ledger based control of large-scale, power grid energy resources	Dolby Intellectual Property Licensing, LLC	Active
325450-US-1	US	1/2/2019	US16/238348	US10924106	2/16/2021	Miller transition control gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
325450-US-2	US	1/13/2021	US17/148340	US11381236	7/5/2022	Miller transition control gate drive circuit	Dolby Intellectual Property Licensing, LLC	Active
326309-US-1	US	1/22/2019	US16/253390	US11395920	7/26/2022	Brain connectivity atlas for personalized functional neurosurgery targeting and brain stimulation programming	Joint ownership - Dolby Intellectual Property Licensing, LLC and University Health Network	Active
327645-IN-1	IN	9/7/2018	IN201843033690A	IN425957	3/24/2023	Integrated electronic component of a receiver unit of a	Dolby Intellectual Property Licensing, LLC	Active
502201-CN-3	CN	4/20/2020	CN202080025845.A	CN113646409	3/29/2024	Method for enhancing the stability and dispersibility of phosphors and the resulting phosphors	Dolby Intellectual Property Licensing, LLC	Active
502201-CN-9	CN	4/20/2020	CN202310994966.A	CN117025197	11/10/2023	â¢ŽèŽâ¼°ç£·å…‰è¯¯å·®å¼•èµ·çš„é£Ÿå“æ–¹æ³•å¼•èµ·çš„é£Ÿå“æ–¹æ³•å…‰è¯¯	Dolby Intellectual Property Licensing, LLC	Active
502201-EP-4	EP	4/20/2020	EP20809356.4	EP3973034	3/30/2022	Method to enhance phosphor robustness and dispersability and resulting phosphors	Dolby Intellectual Property Licensing, LLC	Active
502201-JP-5	JP	4/20/2020	JP2021560923.A	JP2022533904	7/27/2022	è›å…‰è¯¯å·®å¼•èµ·çš„é£Ÿå“æ–¹æ³•ã'è«–ã,ãæ–¹æ³•ã,‰ã¾ãŸã¯ã—ãŸè›å…‰è¯¯å·®å¼•èµ·çš„é£Ÿå“æ–¹æ³•	Dolby Intellectual Property Licensing, LLC	Active
502201-KR-6	KR	4/20/2020	KR20217041809.A	KR20210158413	12/30/2021	Methods and resulting phosphors for improving the stiffness and dispersibility of phosphors	Dolby Intellectual Property Licensing, LLC	Active
502201-US-1	US	5/22/2019	US16/419206	US11261375	3/1/2022	Method to enhance phosphor robustness and dispersability and resulting phosphors	Dolby Intellectual Property Licensing, LLC	Active
502201-US-8	US	1/18/2022	US17/578335	US11746288	9/5/2023	Method to enhance phosphor robustness and dispersability and resulting phosphors	Dolby Intellectual Property Licensing, LLC	Active

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502452-US-1	US	7/30/2019	US16/525807	US11693763	7/4/2023	Resilient estimation for grid situational awareness	Dolby Intellectual Property Licensing, LLC	Active
502615-US-1	US	1/22/2019	US16/253430	US11273310	3/15/2022	Systems and methods for predicting optimal deep brain stimulation parameters	Joint ownership - Dolby Intellectual Property Licensing, LLC and Albany Medical College	Active
508774-CN-5	CN	12/9/2020	CN202080084415.A	CN114787700	7/22/2022	Display with extended color gamut coverage and low blue light emission	Dolby Intellectual Property Licensing, LLC	Active
508774-EP-6	EP	12/9/2020	EP20899397.A	EP4073579	10/19/2022	Displays with expanded gamut coverage and low blue light emission	Dolby Intellectual Property Licensing, LLC	Active
508774-JP-7	JP	12/9/2020	JP2022533317A	JP2023505179	2/8/2023	æ¤œå‡ºµå•ã‚ŒãŸå‰Ÿã‚«ã‚‰ã‚ã‚‰ã‚Žã‚‰ã‚Ž‰ã‚Ž‰ç¯„å……‰ã‚’æ‹¡å¼µã—ãŸãƒ‡ã‚£ã‚¹ãƒ—ãƒ¬ã‚¤	Dolby Intellectual Property Licensing, LLC	Active
508774-KR-8	KR	12/9/2020	KR20227023388A	KR20220110563	8/8/2022	Display with extended color gamut coverage and low green light emission	Dolby Intellectual Property Licensing, LLC	Active
508774-TW-3	TW	12/9/2020	TW109143525A	TW202129383	8/1/2021	Displays with expanded gamut coverage and low blue light emission	Dolby Intellectual Property Licensing, LLC	Active
508774-US-4	US	12/9/2020	US17/783626	US20230007906	1/12/2023	Displays with expanded gamut coverage and low blue light emission	Dolby Intellectual Property Licensing, LLC	Active
508774-VN-9	VN		1-2022-04297	N/A			Dolby Intellectual Property Licensing, LLC	Active
509591-CN-7	CN	1/19/2021	CN202180042068.A	CN115698199	2/3/2023	Ink composition and film with narrow-band emission phosphor material	Dolby Intellectual Property Licensing, LLC	Active
509591-EP-10	EP	1/19/2021	EP21788285.A	EP4136177	2/22/2023	Ink compositions and films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-JP-11	JP	1/19/2021	JP2022562355A	JP2023521844A	5/25/2023		Dolby Intellectual Property Licensing, LLC	Active
509591-KR-12	KR	1/19/2021	KR20227039632A	KR20220165280	12/14/2022	Ink compositions and films containing narrowband light emitting phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-TW-6	TW	4/8/2021	TW110112714A	TW202204535	2/1/2022	Ink compositions and films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-US-14	US	1/5/2023	US18/150675	US20230279254	9/7/2023	Films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-US-4	US	1/19/2021	US17/152736	US11312876	4/26/2022	Ink compositions with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-US-5	US	1/19/2021	US17/152751	US11254864	2/22/2022	Films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-US-8	US	12/16/2021	US17/552648	US11578225	2/14/2023	Films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509591-US-9	US	3/22/2022	US17/701592	US11781028	10/10/2023	Ink compositions with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
509730-CN-6	CN	4/13/2021	CN202180042076.A	CN115667457	1/31/2023	Green light emitting phosphor and device thereof	Dolby Intellectual Property Licensing, LLC	Active
509730-EP-7	EP	4/13/2021	EP21788570.A	EP4136187	2/22/2023	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
509730-JP-8	JP	4/13/2021	JP2022562412A	JP2023522185A	5/29/2023		Dolby Intellectual Property Licensing, LLC	Active
509730-KR-9	KR	4/13/2021	KR20227039624A	KR20220160603	12/13/2022	Green light emitting phosphor and device thereof	Dolby Intellectual Property Licensing, LLC	Active
509730-TW-5	TW	4/14/2021	TW110113479A	TW202146627	12/16/2021	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active

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509730-US-11	US	4/13/2021	US17/919180	US20230159824	5/25/2023	Green-emitting phosphors and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
509730-VN-10	VN		1-2022-07315	N/A			Dolby Intellectual Property Licensing, LLC	Active
509746-CN-4	CN	7/16/2021	CN202180063952A	CN116746018	9/12/2023	Power controller in a wireless power receiving device	Dolby Intellectual Property Licensing, LLC	Active
509746-EP-5	EP	7/16/2021	EP21755865A	EP4183015	5/24/2023	Power controller in a wireless power reception apparatus	Dolby Intellectual Property Licensing, LLC	Active
509746-IN-1	IN	7/20/2020	IN202011030957A	IN202011030957	1/21/2022	Power controller in a wireless power reception apparatus	Dolby Intellectual Property Licensing, LLC	Active
509746-JP-6	JP	7/16/2021	JP2023504162A	JP2023534830A	8/14/2023		Dolby Intellectual Property Licensing, LLC	Active
509746-KR-7	KR	7/16/2021	KR20237005678A	KR20230038572	3/20/2023	Power controller in wireless power receiver	Dolby Intellectual Property Licensing, LLC	Active
509746-US-3	US	7/16/2021	US18/006208	US20230283117	9/7/2023	Power controller in a wireless power reception apparatus	Dolby Intellectual Property Licensing, LLC	Active
602226-CN-4	CN	12/8/2021	CN202180092352A	CN116830421	9/29/2023	Pulse width communication in a wireless power system	Dolby Intellectual Property Licensing, LLC	Active
602226-EP-5	EP	12/8/2021	EP21835913A	EP4260433	10/18/2023	Pulse width communication in a wireless power system	Dolby Intellectual Property Licensing, LLC	Active
602226-IN-1	IN	12/8/2020	IN202011053481A	IN202011053481	6/10/2022	Pulse width communication in a wireless power system	Dolby Intellectual Property Licensing, LLC	Active
602226-JP-6	JP	12/8/2021	JP2023534590A	JP2023553065A	12/20/2023		Dolby Intellectual Property Licensing, LLC	Active
602226-KR-7	KR	12/8/2021	KR20237022697A	KR20230118135	8/10/2023	Pulse width communication in wireless power systems	Dolby Intellectual Property Licensing, LLC	Active
602226-US-3	US	12/8/2021	US18/256539	US20240030754	1/25/2024	Pulse width communication in a wireless power system	Dolby Intellectual Property Licensing, LLC	Active
602226-VN-8	VN		1-2023-04458	N/A			Dolby Intellectual Property Licensing, LLC	Active
602751-CN-4	CN	8/31/2021	CN202180072958A	CN116348571	6/27/2023	Device compatible with night vision device	Dolby Intellectual Property Licensing, LLC	Active
602751-EP-5	EP	8/31/2021	EP21865000A	EP4208521	7/12/2023	Devices compatible with night vision equipment	Dolby Intellectual Property Licensing, LLC	Active
602751-JP-6	JP	8/31/2021	JP2023513904A	JP2023539329A	9/13/2023		Dolby Intellectual Property Licensing, LLC	Active
602751-KR-7	KR	8/31/2021	KR20237009153A	KR20230059803	5/3/2023	Element compatible with night vision equipment	Dolby Intellectual Property Licensing, LLC	Active
602751-TW-3	TW	9/1/2021	TW110132488A	TW202227591	7/16/2022	Devices compatible with night vision equipment	Dolby Intellectual Property Licensing, LLC	Active
602751-US-9	US	3/1/2023	US18/116260	US20230246013	8/3/2023	Devices compatible with night vision equipment	Dolby Intellectual Property Licensing, LLC	Active
602751-VN-8	VN		1-2023-02042	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-CN-7	CN	4/13/2022	CN202280033927A	CN117296162	12/26/2023	Uranium-based phosphor and composition for display and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-EP-8	EP	4/13/2022	EP22788838A	EP4324034	2/21/2024	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active

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605665-KR-10	KR	4/13/2022	KR20237038320A	KR20230170708	12/19/2023	Uranium-based phosphors and compositions for display and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-TW-3	TW	4/13/2022	TW111114071A	TW202249302	12/16/2022	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-TW-5	TW	10/11/2022	TW111138506A	TW202328399	7/16/2023	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-US-6	US	10/14/2022	US17/966638	US20230287265	9/14/2023	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
607692A-TW-2	TW	4/7/2023	TW112113158A	TW202403016	1/16/2024		Dolby Intellectual Property Licensing, LLC	Active
607692A-WO-1	WO	4/6/2023	US2023065472W	WO2023215670	11/9/2023	Phosphor compositions and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
607692B-TW-2	TW	5/4/2023	TW112116636A	TW202407080	2/16/2024		Dolby Intellectual Property Licensing, LLC	Active
607692B-WO-1	WO	5/4/2023	US2023020966W	WO2023215457	11/9/2023	Red-emitting phosphors having small particle size, processes for preparing and devices thereof	Dolby Intellectual Property Licensing, LLC	Active
607693-TW-5	TW	5/4/2023	TW112116639A	TW202407059	2/16/2024		Dolby Intellectual Property Licensing, LLC	Active
607693-WO-2	WO	5/4/2023	US2023020927W	WO2023215433	11/9/2023	Systems and methods for depositing phosphor containing ink	Dolby Intellectual Property Licensing, LLC	Active
RD27644-US-2	US	10/26/2000	US09/697562	US7287087	10/23/2007	Communications network for dynamic reprioritization	Dolby Intellectual Property Licensing, LLC	Active
RD28356-DE-4	DE	2/26/2007	EP07751816A	EP1999230	6/13/2012	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
RD28356-GB-5	GB	2/26/2007	EP07751816A	EP1999230	6/13/2012	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
RD28356-US-1	US	2/2/2005	US11/049598	US7358542	4/15/2008	Red emitting phosphor materials for use in led and led applications	Dolby Intellectual Property Licensing, LLC	Active
604111-WO-3	WO	3/24/2023	US2023016265W	WO2023183590	9/28/2023	Safety and security of cyber-physical systems connected through iot network	Dolby Intellectual Property Licensing, LLC	Active
508927-US-1	US	9/20/2021	US17/479370	US12067124	8/20/2024	Systems and methods for node selection and ranking in cyber-physical systems	Dolby Intellectual Property Licensing, LLC	Active
606915-WO-2	WO	5/22/2023	US2023067283W	WO2023230434	11/30/2023	Distributed anomaly detection and localization for cyber-physical systems	Dolby Intellectual Property Licensing, LLC	Active
607309-WO-2	WO	9/11/2023	US2023073880W	WO2024055044	3/14/2024	System and method for distributed quantum entanglement	Dolby Intellectual Property Licensing, LLC	Active
602905-US-1	US	8/19/2021	US17/406205	US20230071394	3/9/2023	Systems and methods for cyber-fault detection	Dolby Intellectual Property Licensing, LLC	Active
602905-EP-4	EP	8/19/2022	EP22859418A	EP4388423	6/26/2024	Systems and methods for cyber-fault detection	Dolby Intellectual Property Licensing, LLC	Active
602922-US-1	US	8/19/2021	US17/406246	US20230075736	3/9/2023	Systems and methods for self-adapting neutralization against cyber-faults	Dolby Intellectual Property Licensing, LLC	Active
602922-EP-4	EP	8/19/2022	EP22859420A	EP4388435	6/26/2024	Systems and methods for self-adapting neutralization against cyber-faults	Dolby Intellectual Property Licensing, LLC	Active
145823-US-1	US	11/15/2004	US10/990193	US7327113	2/5/2008	Electric starter generator system employing bidirectional buck-boost power converters, and methods therefor	Dolby Intellectual Property Licensing, LLC	Active

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162711-JP-5	JP	6/25/2007	JP2007165724A	JP5202882	6/5/2013	Micro-electromechanical system based arcless switching with circuitry to absorb electrical energy during fault conditions	Dolby Intellectual Property Licensing, LLC	Active
162711-KR-6	KR	6/26/2007	KR20070063322A	KR101445386	9/26/2014	Micro-electromechanical system based arc-less switching with circuitry for absorbing electrical energy during a fault condition	Dolby Intellectual Property Licensing, LLC	Active
162711-MX-7	MX	11/27/2007	MX2007014897A	MX2007014897	2/19/2009	Micro-electromechanical system based arc-less switching with circuitry for absorbing electrical energy during a fault condition.	Dolby Intellectual Property Licensing, LLC	Active
162711-US-8	US	12/14/2010	US12/967526	US8050000	11/1/2011	Micro-electromechanical system based arc-less switching with circuitry for absorbing electrical energy during a fault condition	Dolby Intellectual Property Licensing, LLC	Active
162711-FR-10	FR	6/19/2007	EP07110553A	EP1928005	9/25/2013	Micro-electromechanical system based arc-less switching with circuitry for absorbing electrical energy during a fault condition	Dolby Intellectual Property Licensing, LLC	Active
216634-CN-3	CN	2/13/2008	CN200880010725A	CN101646747	9/18/2013	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
216634-KR-4	KR	2/13/2008	KR20097019091A	KR101623482	5/23/2016	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
216634-CN-5	CN	2/13/2008	CN201310351655A	CN103400926	12/8/2017	Red line emitting phosphors for led applications	Dolby Intellectual Property Licensing, LLC	Active
216634-JP-8	JP	10/31/2014	JP2014222926A	JP2015084327	4/30/2015	Red color line discharge release fluorescent substance for using it for a light emitting diode use	Dolby Intellectual Property Licensing, LLC	Active
216634-JP-9	JP	5/11/2016	JP2016095402A	JP2016181705	10/13/2016	Red color line discharge release fluorescent substance for using it for a light emitting diode use	Dolby Intellectual Property Licensing, LLC	Active
216634-KR-10	KR	2/13/2008	KR20157009504A	KR101731741	4/28/2017	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
216634-JP-12	JP	5/8/2017	JP2017092503A	JP6625582	12/25/2019	Red color line discharge release fluorescent substance for using it for a light emitting diode use	Dolby Intellectual Property Licensing, LLC	Active
236159-US-3	US	3/23/2010	US12/729297	US8647767	2/11/2014	Sodium-metal-halide energy storage device with sodium level control mechanism	Dolby Intellectual Property Licensing, LLC	Active
239040-US-16	US	1/24/2024	US18/421275	US20240157821	5/16/2024	Apparatus and method for rapid charging using shared power electronics	Dolby Intellectual Property Licensing, LLC	Active
241497-CN-2	CN	12/16/2010	CN201010615732A	CN102103945	1/1/2014	Switch structure and associated circuit	Dolby Intellectual Property Licensing, LLC	Active
241497-JP-4	JP	12/8/2010	JP2010273081A	JP2011129516	6/30/2011	Switch structure and associated circuit	Dolby Intellectual Property Licensing, LLC	Active
241497-KR-5	KR	12/16/2010	KR20100129440A	KR101737120	5/17/2017	Switch structure and associated circuit	Dolby Intellectual Property Licensing, LLC	Active
241497-DE-6	DE	12/10/2010	EP10194449A	EP2337043	3/30/2016	Switch structure and associated circuit	Dolby Intellectual Property Licensing, LLC	Active
246663-US-1	US	6/27/2011	US13/169220	US9964625	5/8/2018	Electrical substation fault monitoring and diagnostics	Dolby Intellectual Property Licensing, LLC	Active
246941-US-2	US	12/30/2010	US12/981846	US8789969	7/29/2014	Compact led light engine with reflector cups and highly directional lamps using same	Dolby Intellectual Property Licensing, LLC	Active
265951-CA-4	CA	10/26/2015	CA2968353A	CA2968353	6/27/2023	Multichannel relay assembly with in line mems switches	Dolby Intellectual Property Licensing, LLC	Active
277187-CA-4	CA	4/5/2016	CA3018505A	CA3018505	10/12/2017	Activated platelet composition with tunable growth factor level	Dolby Intellectual Property Licensing, LLC	Active

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281133-CA-4	CA	12/29/2016	CA3009523A	CA3009523	7/6/2017	Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
281133-KR-12	KR	12/29/2016	KR20187022044A	KR20180098402	9/3/2018	Activation of calcium control of platelets by electrical stimulation	Dolby Intellectual Property Licensing, LLC	Active
307094-US-7	US	11/16/2010	US12/947244	US9077002	7/7/2015	Fuel cell system and operating method	Dolby Intellectual Property Licensing, LLC	Active
314859-GB-6	GB	10/20/2017	EP17794516A	EP3555640	7/3/2024	Dc leakage current detector and method of operation thereof for leakage current detector in dc power circuits	Dolby Intellectual Property Licensing, LLC	Active
315132-US-3	US	10/7/2008	US12/247157	US8006136	8/23/2011	Automatic grammar based fault detection and isolation	Dolby Intellectual Property Licensing, LLC	Active
315166-US-2	US	2/27/2009	US12/395235	US8132053	3/6/2012	System and method for grammar based test planning	Dolby Intellectual Property Licensing, LLC	Active
315166-US-4	US	3/2/2012	US13/411379	US8489926	7/16/2013	System and method for grammar based test planning	Dolby Intellectual Property Licensing, LLC	Active
315166-US-5	US	7/12/2013	US13/941378	US8738967	5/27/2014	System and method for grammar based test planning	Dolby Intellectual Property Licensing, LLC	Active
315166-US-6	US	4/10/2014	US14/249805	US9122671	9/1/2015	System and method for grammar based test planning	Dolby Intellectual Property Licensing, LLC	Active
315170-US-3	US	2/27/2009	US12/395363	US8433542	4/30/2013	Testing framework for control devices	Dolby Intellectual Property Licensing, LLC	Active
315170-US-4	US	9/14/2012	US13/620532	US8949063	2/3/2015	Testing framework for control devices	Dolby Intellectual Property Licensing, LLC	Active
315170-US-5	US	1/30/2015	US14/610920	US9400725	7/26/2016	Testing framework for control devices	Dolby Intellectual Property Licensing, LLC	Active
317707-VN-8	VN		1-2020-02139	N/A			Dolby Intellectual Property Licensing, LLC	Active
318587-CN-8	CN	8/31/2017	CN202410515485A	CN118428831	8/2/2024		Dolby Intellectual Property Licensing, LLC	Active
322985-CN-7	CN	2/25/2019	CN202410625931A	CN118509176	8/16/2024	ä¿¡è¿°å·¥ä¸šæ•°æ®ç¼–è¯‘ç¨‹åº»ŸåŠ·ä¸šæ•°æ®ç¼–è¯‘å…¨è¿‡ç¨‹æ‰§è¡	Dolby Intellectual Property Licensing, LLC	Active
502201-VN-7	VN		1-2021-07462	N/A			Dolby Intellectual Property Licensing, LLC	Active
509591-VN-13	VN		1-2022-07394	N/A			Dolby Intellectual Property Licensing, LLC	Active
509591-CN-15	CN	1/19/2021	CN202311774912A	CN117986927	5/7/2024	Ink composition and film with narrow-band emissive phosphor material	Dolby Intellectual Property Licensing, LLC	Active
509591-TW-16	TW		113103075	N/A			Dolby Intellectual Property Licensing, LLC	Active
509591-EP-17	EP	1/19/2021	EP24160690A	EP4410911	8/7/2024	Ink compositions and films with narrow band emission phosphor materials	Dolby Intellectual Property Licensing, LLC	Active
602928-US-1	US		63/643,693	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-JP-9	JP	4/13/2022	JP2023562814A	JP2024517092	4/19/2024	ã‚ãƒ©ãƒçµ»è¿…ã‚½ãƒªãƒ¥ãƒ¼ã‚·ãƒ§ãƒ³ã‚’æ‰±ã†ãŸã‚ã®ã‚·ã‚¹ãƒ†ãƒ ã€ãŠã‚ˆã³æ–¹æ³•	Dolby Intellectual Property Licensing, LLC	Active
605665-VN-11	VN		1-2023-07887	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-CN-12	CN	10/10/2022	CN202280067631A	CN118076710	5/24/2024	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active

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605665-EP-13	EP	10/10/2022	EP22879550A	EP4413090	8/14/2024	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-KR-15	KR	10/10/2022	KR20247010819A	KR20240087778	6/19/2024	Uranium-based phosphors and compositions for displays and lighting applications	Dolby Intellectual Property Licensing, LLC	Active
605665-VN-16	VN		1-2024-03133	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-BR-18	BR		BR112024006755-6	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-MY-20	MY		PI 2024001746	N/A			Dolby Intellectual Property Licensing, LLC	Active
605665-MX-21	MX		MX/a/2024/004161	N/A			Dolby Intellectual Property Licensing, LLC	Active
607693-US-3	US		63/453,396	N/A			Dolby Intellectual Property Licensing, LLC	Active
607693-US-4	US		63/498,414	N/A			Dolby Intellectual Property Licensing, LLC	Active
607693-US-7	US	11/6/2023	US18/502765	US20240117208	4/11/2024	Systems and methods for depositing phosphor containing ink	Dolby Intellectual Property Licensing, LLC	Active
608197-US-2	US		63/642,183	N/A			Dolby Intellectual Property Licensing, LLC	Active
610280-US-1	US		63/561,973	N/A			Dolby Intellectual Property Licensing, LLC	Active
610288-US-1	US		63/561,999	N/A			Dolby Intellectual Property Licensing, LLC	Active
610319-US-1	US		63/555,346	N/A			Dolby Intellectual Property Licensing, LLC	Active
610601-US-1	US		63/644,203	N/A			Dolby Intellectual Property Licensing, LLC	Active
610770-KR-2	KR	5/29/2015	KR20150076499A	KR102441273	9/8/2022	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-KR-3	KR	9/2/2022	KR20220111133A	KR102599619	11/2/2023	Light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610770-KR-4	KR	10/27/2023	KR20230145352A	KR20230154778	11/9/2023	Light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610770-US-5	US	8/18/2015	US14/828937	US9741907	8/22/2017	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-US-6	US	7/10/2017	US15/645632	US10249801	4/2/2019	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-US-7	US	4/1/2019	US16/371774	US10424697	9/24/2019	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-CN-9	CN	8/18/2015	CN201510509309A	CN105374922	9/21/2018	Light emission diode package member and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
610770-CN-10	CN	8/18/2015	CN201810952946A	CN109181685	1/11/2019	Light emission diode package member and its manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
610770-EP-11	EP	8/10/2015	EP15180388A	EP2988340	10/11/2017	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-FR-13	FR	8/10/2015	EP15180388A	EP2988340	10/11/2017	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-DE-14	DE	8/10/2015	EP15180388A	EP2988340	10/11/2017	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active
610770-GB-15	GB	8/10/2015	EP15180388A	EP2988340	10/11/2017	Light emitting diode package and manufacturing method thereof	Dolby Intellectual Property Licensing, LLC	Active

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610772-KR-1	KR	1/28/2011	KR20110008736A	KR101761834	7/27/2017	Wafer level led package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Active
610772-US-2	US	1/26/2012	US13/359287	US8592232	11/26/2013	Wafer level led package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Active
610772-US-3	US	11/7/2013	US14/074098	US8916898	12/23/2014	Wafer level led package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Active
610772-TW-4	TW	1/30/2012	TW101102898A	TWI528595	4/1/2016	Wafer level led package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Active
610772-CN-6	CN	1/13/2012	CN201280006927A	CN103339749	3/30/2016	Wafer led packaging part and manufacture this method	Dolby Intellectual Property Licensing, LLC	Active
610772-FR-11	FR	1/13/2012	EP14150304A	EP2720283	5/16/2018	Wafer-level light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610772-DE-12	DE	1/13/2012	EP14150304A	EP2720283	5/16/2018	Wafer-level light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610772-IT-13	IT	1/13/2012	EP14150304A	EP2720283	5/16/2018	Wafer-level light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610772-NL-14	NL	1/13/2012	EP14150304A	EP2720283	5/16/2018	Wafer-level light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610772-GB-15	GB	1/13/2012	EP14150304A	EP2720283	5/16/2018	Wafer-level light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610772-DE-16	DE	1/13/2012	EP12739572A	EP2669963	8/22/2018	Method of fabricating a light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-1	KR	1/7/2010	KR20100000189A	KR101618799	5/9/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-2	KR	1/7/2010	KR20100000190A	KR101618800	5/9/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-3	KR	1/7/2010	KR20100000120A	KR101615277	4/25/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-4	KR	1/7/2010	KR20100000120A	KR101615283	4/25/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-5	KR	1/7/2010	KR20100000140A	KR101623952	5/24/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-6	KR	1/8/2010	KR20100000181A	KR101623951	5/24/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-11	US	9/14/2012	US13/617810	US8436369	5/7/2013	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-12	US	4/15/2013	US13/862713	US8742449	6/3/2014	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-13	US	3/28/2014	US14/229672	US9012952	4/21/2015	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-14	US	3/31/2014	US14/231043	US9018669	4/28/2015	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-15	US	3/11/2015	US14/645227	US9419180	8/16/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-US-16	US	7/1/2016	US15/200633	US9793440	10/17/2017	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-CN-17	CN	1/7/2011	CN201110006046A	CN102122694	7/3/2013	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active

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610773-EP-18	EP	1/4/2011	EP11150117A	EP2343744	3/11/2020	Light emitting diode with patterned electrodes	Dolby Intellectual Property Licensing, LLC	Active
610773-TW-19	TW	1/4/2011	TW100100166A	TWI412165	10/11/2013	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-JP-21	JP	1/5/2011	JP2011000833A	JP2011142324	7/21/2011	Light emitting diode having a plurality of electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-JP-22	JP	5/28/2015	JP2015109013A	JP2015173289	10/1/2015	The light emitting diode which has several electrode pad	Dolby Intellectual Property Licensing, LLC	Active
610773-JP-23	JP	11/16/2016	JP2016223502A	JP6574750	9/11/2019	Light emitting diode	Dolby Intellectual Property Licensing, LLC	Active
610773-FR-24	FR	1/4/2011	EP11150117A	EP2343744	3/11/2020	Light emitting diode with patterned electrodes	Dolby Intellectual Property Licensing, LLC	Active
610773-DE-25	DE	1/4/2011	EP11150117A	EP2343744	3/11/2020	Light emitting diode with patterned electrodes	Dolby Intellectual Property Licensing, LLC	Active
610773-GB-26	GB	1/4/2011	EP11150117A	EP2343744	3/11/2020	Light emitting diode with patterned electrodes	Dolby Intellectual Property Licensing, LLC	Active
RD28356-FR-3	FR	2/26/2007	EP07751816A	EP1999230	6/13/2012	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
RD28356-NL-6	NL	2/26/2007	EP07751816A	EP1999230	6/13/2012	Red line emitting phosphors for use in led applications	Dolby Intellectual Property Licensing, LLC	Active
RD28356-JP-8	JP	2/26/2007	JP2008557338A	JP5715327	5/7/2015	Red line emitting phosphors for use in light emitting diode applications	Dolby Intellectual Property Licensing, LLC	Active
281133-RU-19	RU	12/29/2016	2021102581			CALCIUM CONTROLLED ACTIVATION OF PLATELETS VIA ELECTRICAL STIMULATION	Dolby Intellectual Property Licensing, LLC	Active
281133-RU-25	RU	12/29/2016	2024115920			CALCIUM CONTROLLED ACTIVATION OF PLATELETS VIA ELECTRICAL STIMULATION	Dolby Intellectual Property Licensing, LLC	Active
285990-US-12	US	4/4/2024	18/627,213	US-2024-0333034-A1	10/3/2024	SYSTEM AND METHOD FOR PROTECTING A WIRELESS POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Active
285990-JP-13	JP	1/30/2017	2024-133554			SYSTEM AND METHOD FOR PROTECTING A WIRELESS POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Active
314859-UP-5	UP	9/2/2024	17794516.9	3555640		DC LEAKAGE CURRENT DETECTOR AND METHOD OF OPERATION THEREOF FOR LEAKAGE CURRENT DETECTION IN DC POWER CIRCUITS	Dolby Intellectual Property Licensing, LLC	Active
318543-US-9	US	3/15/2024	18/606,235			INTELLECTUAL PROPERTY EXCHANGE ECOSYSTEM FOR ADDITIVE MANUFACTURING	Dolby Intellectual Property Licensing, LLC	Active
319318-CN-5	CN	4/19/2018	2.024IE+11	CN117977825A	5/3/2024	A POWER TRANSFER DEVICE AND AN ASSOCIATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Active
319319-CN-6	CN		2.02411E+12	CN118413013A	7/30/2024	Dual Band Concentric Coil toplogy for Universal Charging Pad	Dolby Intellectual Property Licensing, LLC	Active
319620-KR-8	KR	8/21/2018	10-2024-7026143			TRUE TIME DELAY BEAM FORMER MODULE AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Active

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319639-FR-7	FR	8/27/2018	18869267.7	3698429		HIGH IMPEDANCE RF MEMS TRANSMISSION DEVICES AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Active
319639-DE-8	DE	8/27/2018	18869267.7	3698429		HIGH IMPEDANCE RF MEMS TRANSMISSION DEVICES AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Active
319639-GB-9	GB	8/27/2018	18869267.7	3698429		HIGH IMPEDANCE RF MEMS TRANSMISSION DEVICES AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Active
320002-US-13	US		May be filed			HIERARCHICAL DATA EXCHANGE MANAGEMENT SYSTEM	Dolby Intellectual Property Licensing, LLC	Active
324845-US-9	US	4/5/2024	18/627,854	US-2024-0339263-A1	10/10/2024	A RECEIVER UNIT OF A WIRELESS POWER TRANSFER SYSTEM AND AN ASSOCIATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Active
324845-TW-10	TW	4/15/2019	113132609			A RECEIVER UNIT OF A WIRELESS POWER TRANSFER SYSTEM AND AN ASSOCIATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Active
502452-US-2	US	5/22/2023	18/321,545	US-2023-0385186	11/30/2023	Resilient Estimation for Grid Situational Awareness	Dolby Intellectual Property Licensing, LLC	Active
508774-CN-10	CN	12/9/2020	2.02411E+11	CN118981134A	11/19/2024	LIGHT EMITTING DEVICES AND DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION AND METHODS FOR PRODUCING	Dolby Intellectual Property Licensing, LLC	Active
508774-US-11	US	11/7/2024	18/939878			LIGHT EMITTING DEVICES AND DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION AND METHODS FOR PRODUCING	Dolby Intellectual Property Licensing, LLC	Active
508774-JP-12	JP		May be filed			LIGHT EMITTING DEVICES AND DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION AND METHODS FOR PRODUCING	Dolby Intellectual Property Licensing, LLC	Active
508927-CN-3	CN	9/20/2022	May be filed			Systems and Methods for Node Selection and Ranking in Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
508927-EP-4	EP	3/19/2024	22871025.7			Systems and Methods for Node Selection and Ranking in Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
508927-US-5	US	9/20/2022	May be filed			Systems and Methods for Node Selection and Ranking in Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
508927-US-6	US	7/3/2024	18/762,999			Systems and Methods for Node Selection and Ranking in Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
509591-US-18	US	11/7/2024	18/939,975			INK FORMULATIONS WITH NARROW BAND EMITTING PHOSPHOR MATERIALS	Dolby Intellectual Property Licensing, LLC	Active
509730-US-12	US		May be filed			GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
509730-CN-13	CN	4/13/2021	2.02411E+11			GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
602751-US-10	US	11/7/2024	18/939,772			DEVICES COMPATIBLE WITH NIGHT VISION EQUIPMENT	Dolby Intellectual Property Licensing, LLC	Active
602905-CN-3	CN	8/19/2022	May be filed			Systems and Methods for Cyber-Fault Detection	Dolby Intellectual Property Licensing, LLC	Active

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602922-CN-3	CN	8/19/2022	May be filed			Systems and Methods for Self-Adapting Neutralization Against Cyber-Faults	Dolby Intellectual Property Licensing, LLC	Active
604111-US-4	US	3/24/2023	18/850,484			SAFETY AND SECURITY OF CYBER-PHYSICAL SYSTEMS CONNECTED THROUGH IOT NETWORK	Dolby Intellectual Property Licensing, LLC	Active
605665-WO-4	WO	10/10/2022	PCT/US2022/077858	WO/2023/060281	4/13/2023	URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
605665-JP-14	JP	10/10/2022	2024-521064			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
605665-US-17	US	10/10/2022	18/698,659			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
605665-IN-19	IN	10/10/2022	2.02417E+11			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
605665-TH-22	TH	10/10/2022	2401002134			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
605665-US-23	US		May be filed			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Active
606915-CN-3	CN	5/22/2023	May be filed			Distributed Anomaly Detection and Localization for Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
606915-EP-4	EP	5/22/2023	May be filed			Distributed Anomaly Detection and Localization for Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
606915-US-5	US	5/22/2023	May be filed			Distributed Anomaly Detection and Localization for Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Active
607693-WO-6	WO	11/6/2023	PCT/US2023/036871	WO/2024/196409	9/26/2024	PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-TW-8	TW	11/6/2023	112142720	202438643	10/1/2024	PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-BR-9	BR	5/4/2023	BR 11 2024 023003-1			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-CN-10	CN	5/4/2023	May be filed			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-EP-11	EP	5/4/2023	23800008.7			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-IN-12	IN	5/4/2023	2.02417E+11			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-JP-13	JP	5/4/2023	2024-564628			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-KR-14	KR	5/4/2023	10-2024-7039504			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-MY-15	MY	5/4/2023	PI 2024006294			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-MX-16	MX	5/4/2023	MX/a/2024/013586			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active

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607693-TH-17	TH	5/4/2023	2401007141			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-US-18	US	5/4/2023	18/862,598			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-VN-19	VN	5/4/2023	1-2024-08939			SYSTEMS AND METHODS FOR DEPOSITING PHOSPHOR CONTAINING INK	Dolby Intellectual Property Licensing, LLC	Active
607693-BR-20	BR	11/6/2023	May be filed			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-CN-21	CN	11/6/2023	May be filed			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-EP-22	EP	11/6/2023	23928965.5			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-IN-23	IN	11/6/2023	2.02417E+11			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-JP-24	JP	11/6/2023	May be filed			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-KR-25	KR	11/6/2023	10-2024-7039108			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-MY-26	MY	11/6/2023	PI 2024006810			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-MX-27	MX	11/6/2023	MX/a/2024/014088			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-TH-28	TH	11/6/2023	2401007745			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
607693-VN-29	VN	11/6/2023	May be filed			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Active
608197-US-3	US	5/3/2024	18/654,432			Method for optically active structures	Dolby Intellectual Property Licensing, LLC	Active
610319-US-3	US	5/3/2024	18/654,635			Remote Phosphor films in reflective geometry	Dolby Intellectual Property Licensing, LLC	Active
610770-JP-12	JP	8/18/2015	2015-161386	2016-042579	3/31/2016	Light emitting diode package	Dolby Intellectual Property Licensing, LLC	Active
607692A-BR-3	BR	4/6/2023	BR112024022907-6			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Active
607692A-CN-4	CN	4/6/2023	May be filed			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Active
607692A-EP-5	EP	4/6/2023	May be filed			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Active
607692A-IN-6	IN	4/6/2023	May be filed			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Active
607692A-US-7	US	4/6/2023	18/862,301			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Active
607692B-BR-3	BR	5/4/2023	May be filed			RED-EMITTING PHOSPHORS HAVING SMALL PARTICLE SIZE, PROCESSES FOR PREPARING AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
607692B-CN-4	CN	5/4/2023	May be filed			RED-EMITTING PHOSPHORS HAVING SMALL PARTICLE SIZE, PROCESSES FOR PREPARING AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
607692B-EP-5	EP	5/4/2023	May be filed			RED-EMITTING PHOSPHORS HAVING SMALL PARTICLE SIZE, PROCESSES FOR PREPARING AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
607692B-IN-6	IN	5/4/2023	May be filed			RED-EMITTING PHOSPHORS HAVING SMALL PARTICLE SIZE, PROCESSES FOR PREPARING AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
607692B-US-7	US	5/4/2023	18/862,583			RED-EMITTING PHOSPHORS HAVING SMALL PARTICLE SIZE, PROCESSES FOR PREPARING AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Active
610799-US-1	US	8/12/2024	63/681,926			Phosphor-based inks as a luminescent materials for sensing applications	Dolby Intellectual Property Licensing, LLC	Active
610841-US-1	US	8/12/2024	63/681,912			Small size red-emitting phosphors via jet milling	Dolby Intellectual Property Licensing, LLC	Active
610842-US-2	US	8/12/2024	63/682,012			Injection and compression molding of Mn4+ doped fluoride phosphors	Dolby Intellectual Property Licensing, LLC	Active
610876-US-1	US	8/12/2024	63/681,936			Combined inorganic and organic coatings of red-emitting potassium hexafluorosilicate phosphors	Dolby Intellectual Property Licensing, LLC	Active
610878-US-1	US	8/12/2024	63/681,942			Phosphor ceramics and glasses	Dolby Intellectual Property Licensing, LLC	Active
610879-US-1	US	8/12/2024	63/681,977			Injection and compression molding of DF green and red phosphors	Dolby Intellectual Property Licensing, LLC	Active
610890-US-1	US	8/12/2024	63/681,974			Scattering agents size and location to optimize blue to red conversion in a blue to red color converted optical part	Dolby Intellectual Property Licensing, LLC	Active
610896-US-1	US	8/12/2024	63/681,999			Phosphor Powder Coating	Dolby Intellectual Property Licensing, LLC	Active
610897-US-1	US	8/12/2024	63/681,990			Phosphor infused ink in retail signage	Dolby Intellectual Property Licensing, LLC	Active
133987-WO-2	Patent Cooperation Treaty	11/18/2004	US04/38666			HYBRID BATTERY CONFIGURATION WITH BI-DIRECTIONAL CONVERTER GRID INTERFACE AND AUXILIARY POWER UNIT	Dolby Intellectual Property Licensing, LLC	Expired
133987-EP-7	European Patent	11/18/2004	4811389.8	EP1697158	10/17/2007	METHOD AND APPARATUS FOR PRODUCING TRACTIVE EFFORT	Dolby Intellectual Property Licensing, LLC	Expired
134730-US-1	United States of America	3/30/2004	10/813945	US6974333	12/13/2005	HIGH-DENSITY CONNECTION BETWEEN MULTIPLE CIRCUIT BOARDS	Dolby Intellectual Property Licensing, LLC	Expired
145823-CN-4	China	11/15/2005	10137343.3	CN1815870		ELECTRIC STARTER GENERATOR EMPLOYING BUCK-BOOST POWER CONVERTERS	Dolby Intellectual Property Licensing, LLC	Expired
145823-CN-7	China	4/6/2012	2.0121E+11	CN201210112687.9	1/20/2016	BIDIRECTIONAL BUCK-BOOST POWER CONVERTER	Dolby Intellectual Property Licensing, LLC	Expired
146125-WO-2	Patent Cooperation Treaty	8/25/2005	US05/30390	WO06/026421		CROSSLINKABLE AND CROSSLINKED POLYMERS	Dolby Intellectual Property Licensing, LLC	Expired
146125-EP-3	European Patent	8/25/2005	5792879.8	EP1784444	8/13/2014	CROSSLINKABLE AND CROSSLINKED POLYMERS	Dolby Intellectual Property Licensing, LLC	Expired
152861-DE-3	Germany (Federal Republic of)	9/7/2005	1.02005E+11	DE102005042622.0		PHOTOVOLTAIC MODULES FOR SOLAR CONCENTRATOR	Dolby Intellectual Property Licensing, LLC	Expired

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152861-JP-5	Japan	9/8/2005	2005-260353			PHOTOVOLTAIC MODULES FOR SOLAR CONCENTRATOR	Dolby Intellectual Property Licensing, LLC	Expired
155850-CN-2	China	6/6/2006	10099642.7	CN200610099642.7	9/9/2009	PHOTOVOLTAIC CONCENTRATOR FOR SOLAR ENERGY SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
155850-EP-3	European Patent	5/25/2006	6252718.9	EP1732141		PHOTOVOLTAIC CONCENTRATOR FOR SOLAR ENERGY SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
155850-JP-4	Japan	6/6/2006	2006-157088			PHOTOVOLTAIC CONCENTRATOR FOR SOLAR ENERGY SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
162191-CN-2	China	6/29/2007	200710126317.X	CN101335141		MICRO-ELECTROMECHANICAL SYSTEM BASED SOFT SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162191-EP-3	European Patent	6/19/2007	7110554.8	EP2017870	5/15/2013	MICRO-ELECTROMECHANICAL SYSTEM BASED SOFT SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162191-KR-5	Korea, Republic of (KR)	6/29/2007	2007-0065794			MICRO-ELECTROMECHANICAL SYSTEM BASED SOFT SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162191-DE-6	Germany (Federal Republic of)	6/19/2007	7110554.8	DE2017870	5/15/2013	MICRO-ELECTROMECHANICAL SYSTEM BASED SOFT SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162191-GB-8	United Kingdom	6/19/2007	7110554.8	GB2017870	5/15/2013	MICRO-ELECTROMECHANICAL SYSTEM BASED SOFT SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162191-IT-9	Italy	6/19/2007	7110554.8	IT2017870	5/15/2013	MICRO ELECTRO MECHANICAL SYSTEMS MEMS CIRCUIT BREAKER SYSTEM LEVEL CONCEPTS	Dolby Intellectual Property Licensing, LLC	Expired
162667-WO-2	Patent Cooperation Treaty	12/20/2006	US06/49096	WO 2007/081545		HYBRID VEHICLE AND METHOD OF ASSEMBLING SAME	Dolby Intellectual Property Licensing, LLC	Expired
162667-EP-4	European Patent	12/20/2006	6848066.4	EP1976719		HYBRID VEHICLE AND METHOD OF ASSEMBLING SAME	Dolby Intellectual Property Licensing, LLC	Expired
162667-JP-6	Japan	12/20/2006	2008-549500	JP07/081545		HYBRID VEHICLE AND METHOD OF ASSEMBLING SAME	Dolby Intellectual Property Licensing, LLC	Expired
162667-JP-7	Japan	12/20/2006	2013-096100	JP2013177131		PARALLEL HYBRID CONFIGURATION FOR HEAVY DUTY TRUCKS AND BUSES WITH COMBINED BATTERY AND ULTRACAPACITOR ENERGY STORAGE SYSTEM AND INTERFACE	Dolby Intellectual Property Licensing, LLC	Expired
162711-US-1	United States of America	12/20/2005	11/314336	US20070139829A1		MICRO-ELECTROMECHANICAL SYSTEM BASED ARC-LESS SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
162711-CN-3	China	7/2/2007	2.007IE+11	CN200710127330.7	10/10/2012	Micro-Electromechanical System Based Arc-Less Switching With Circuitry For Absorbing Electrical Energy During A Fault Condition	Dolby Intellectual Property Licensing, LLC	Expired
162711-EP-4	European Patent	6/19/2007	7110553	EP1928005	9/25/2013	Micro-Electromechanical System Based Arc-Less Switching With Circuitry For Absorbing Electrical Energy During A Fault Condition	Dolby Intellectual Property Licensing, LLC	Expired
162711-DE-9	Germany (Federal Republic of)	6/19/2007	7110553	DE1928005	9/25/2013	Micro-Electromechanical System Based Arc-Less Switching With Circuitry For Absorbing Electrical Energy During A Fault Condition	Dolby Intellectual Property Licensing, LLC	Expired

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162711-GB-11	United Kingdom	6/19/2007	7110553	GB1928005	9/25/2013	Micro-Electromechanical System Based Arc-Less Switching With Circuitry For Absorbing Electrical Energy During A Fault Condition	Dolby Intellectual Property Licensing, LLC	Expired
162711-IT-12	Italy	6/19/2007	7110553	IT1928005	9/25/2013	Micro-Electromechanical System Based Arc-Less Switching With Circuitry For Absorbing Electrical Energy During A Fault Condition	Dolby Intellectual Property Licensing, LLC	Expired
164314-US-2	United States of America	10/19/2005	11/254094	US2007/023 1826		ASSEMBLY FOR MAGNETICALLY DIRECTED SELF-ASSEMBLY (As amended)	Dolby Intellectual Property Licensing, LLC	Expired
164415-FR-1	France	4/11/2005	503549	FR0503549	5/2/2008	Multiple Motion Compensated Noise Reduction Algorithm	Dolby Intellectual Property Licensing, LLC	Expired
164415-DE-2	Germany (Federal Republic of)	4/10/2006	1.02006E+11	DE10200601 7097A1		Multiple Motion Compensated Noise Reduction Algorithm	Dolby Intellectual Property Licensing, LLC	Expired
164415-JP-3	Japan	4/11/2006	2006-108845	JP5072253	8/31/2012	Multiple Motion Compensated Noise Reduction Algorithm	Dolby Intellectual Property Licensing, LLC	Expired
164415-FR-5	France	4/11/2006	603195	FR0603195	1/4/2008	Multiple Motion Compensated Noise Reduction Algorithm	Dolby Intellectual Property Licensing, LLC	Expired
164467-US-1	United States of America	11/18/2005	11/283459	US2007/015 2238		HETEROSTRUCTURE FIELD EFFECT TRANSISTOR AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
176303-US-1	United States of America	1/9/2006	11/327954	US7489048	2/10/2009	ENERGY STORAGE SYSTEM FOR ELECTRIC OR HYBRID VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
176303-WO-2	Patent Cooperation Treaty	12/15/2006	US06/48133	WO2007/081 495		ENERGY STORAGE SYSTEM FOR ELECTRIC OR HYBRID VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
176303-EP-4	European Patent	12/15/2006	6847706.6	EP1977495	11/24/2010	ENERGY STORAGE SYSTEM FOR ELECTRIC OR HYBRID VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
176303-JP-13	Japan	4/15/2014	2014-083265	JP2014-150718		ULTRACAPACITOR INTERFACE FOR DECOUPLING BATTERY FROM MOTOR TRACTION DRIVE	Dolby Intellectual Property Licensing, LLC	Expired
176918-US-1	United States of America	3/16/2005	60/662149			SINGLE-BIT MICRO-HOLOGRAMS AND A THRESHOLD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-WO-3	Patent Cooperation Treaty	3/15/2006	US06/09249			DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-US-6	United States of America	9/19/2006	60/845579			SINGLE-BIT MICRO-HOLOGRAMS AND A THRESHOLD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-TW-7	Taiwan	3/16/2006	95109026	TWI332772 4	7/21/2010	SINGLE-BIT MICRO-HOLOGRAMS AND A THRESHOLD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-TW-8	Taiwan	9/19/2007	96134916	TWI438561	5/21/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-IN-9	India	3/15/2006	3523/KOLNP/ 2007	IN273227	7/14/2016	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-JP-10	Japan	3/15/2006	2008-501988	JP4847516	10/21/2011	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired

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176918-CA-11	Canada	3/15/2006	2783963	CA2783963	10/7/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-TH-12	Thailand	3/15/2006	601001199	TH39489	4/1/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-MY-13	Malaysia	3/15/2006	PI20061158	MY142083A	8/30/2010	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-14	European Patent	3/15/2006	6738323.2	EP1869510	5/15/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-IL-15	Israel	3/15/2006	185973	IL185973	5/28/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-NO-16	Norway	3/16/2006	20075284	NO338315	8/8/2016	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-RU-17	Russian Federation		2007138218	RU2459284	8/20/2012	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-SG-18	Singapore	3/15/2006	200708432-0	SG135654	3/31/2010	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-TH-19	Thailand	11/22/2007	701004721	TH97812		DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-WO-20	Patent Cooperation Treaty		PCT/US2007/020263			DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-CN-21	China	3/15/2006	2.0068E+11	CN200680017070.1	4/25/2012	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-BR-22	Brazil	3/15/2006	PI0608713-2			SINGLE-BIT MICRO-HOLOGRAMS AND A THRESHOLD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-KR-23	Korea, Republic of (KR)	3/15/2006	2007-7023588	KR10-1274645	6/7/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-CA-24	Canada	9/19/2007	2663380	CA2663380	11/3/2015	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-25	European Patent	3/11/2009	7838470.8	EP2064599	5/8/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-JP-26	Japan	9/19/2007	2009-528346	JP5227322	3/22/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-RU-27	Russian Federation	9/19/2007	2009114712	RU2437134	12/20/2011	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-MX-28	Mexico	3/15/2006	MX/a/2007/01497			SINGLE-BIT MICRO-HOLOGRAMS AND A THRESHOLD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-29	European Patent	9/11/2012	12183883.3	EP2535777	1/8/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-30	European Patent	9/11/2012	12183884.1	EP2535778	4/2/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-DE-31	Germany (Federal Republic of)	3/11/2009	7838470.8	DE2064599	5/8/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-GB-32	United Kingdom	3/11/2009	7838470.8	GB2064599	5/8/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-NL-33	Netherlands	3/11/2009	7838470.8	NL2064599	5/8/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired

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176918-DE-34	Germany (Federal Republic of)	3/15/2006	6738323.2	DE1869510	5/15/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-GB-35	United Kingdom	3/15/2006	6738323.2	GB1869510	5/15/2013	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-DE-36	Germany (Federal Republic of)	9/11/2012	12183883.3	DE2535777	1/8/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-FR-37	France	9/11/2012	12183883.3	FR2535777	1/8/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-GB-38	United Kingdom	9/11/2012	12183883.3	GB2535777	1/8/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-GB-39	United Kingdom	9/11/2012	12183884.1	GB2535778	4/2/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
176918-FR-40	France	9/11/2012	12183884.1	FR2535778	4/2/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
183176-US-1	United States of America	12/19/2006	11/640994	US8483240	7/9/2013	PIGGYBACK NETWORKS	Dolby Intellectual Property Licensing, LLC	Expired
183176-WO-2	Patent Cooperation Treaty	12/19/2007	PCT/US07/025825	WO2008082514		PIGGYBACK NETWORKS	Dolby Intellectual Property Licensing, LLC	Expired
183176-CA-3	Canada	12/19/2007	2672394	CA2672394	2/2/2016	PIGGYBACK NETWORKS	Dolby Intellectual Property Licensing, LLC	Expired
183176-JP-5	Japan	12/19/2007	2009-542874	JP5394253	10/25/2013	PIGGYBACK NETWORKS	Dolby Intellectual Property Licensing, LLC	Expired
183176-KR-6	Korea, Republic of (KR)	12/19/2007	1.0201E+12	KR10-1441431	9/11/2014	PIGGYBACK NETWORKS US CASE IS OWNED BY LOCKHEED	Dolby Intellectual Property Licensing, LLC	Expired
183752-EP-2	European Patent	11/7/2006	6123605.5	EP1785938		METHOD AND SYSTEM FOR GENERATING POLYGONAL BOUNDARY DEFINITIONS FOR IMAGE OBJECTS	Dolby Intellectual Property Licensing, LLC	Expired
183752-JP-3	Japan	11/7/2006	2006-301296	JP4977448	4/20/2012	METHOD AND SYSTEM FOR GENERATING POLYGONAL BOUNDARY DEFINITIONS FOR IMAGE OBJECTS	Dolby Intellectual Property Licensing, LLC	Expired
187674-US-1	United States of America	5/25/2007	60/940313			Method and Apparatus for Assembling Photovoltaic Modules	Dolby Intellectual Property Licensing, LLC	Expired
187674-EP-5	European Patent	5/21/2008	8156634.1	EP1995791	7/22/2015	METHOD AND APPARATUS FOR ASSEMBLING PHOTOVOLTAIC MODULES	Dolby Intellectual Property Licensing, LLC	Expired
189292-WO-2	Patent Cooperation Treaty	1/5/2007	US07/00399	WO 2007/081875		VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
189292-IN-5	India	1/5/2007	5471/DELNP/2008	IN300171	8/23/2018	VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
195378-US-1	United States of America	6/21/2006	11/425603	US2007/0297964		COMPOSITIONS COMPRISING MAGNESIUM BOROHYDRIDE AND MAGNESIUM HYDRIDOBOROHYDRIDE AND METHOD FOR MANUFACTURING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired

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197732-US-1	United States of America	1/18/2006	60/759991			ELECTRIC DRIVE ENERGY MANAGEMENT SYSTEM CONTROL WITH MULTIPLE ENERGY STORAGE UNITS	Dolby Intellectual Property Licensing, LLC	Expired
197732-AU-3	Australia	1/18/2007	2007200207			VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
197732-EP-6	European Patent	1/18/2007	7100757.9	EP1810861	8/11/2010	VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
197732-KR-9	Korea, Republic of (KR)	1/18/2007	2007-0005792			VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
197732-MX-10	Mexico	1/18/2007	MX/A/2007/000823			VEHICLE PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
198520-US-2	United States of America	10/6/2006	11/539340			COMPOSITION AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
205374-EP-3	European Patent	11/26/2007	7121542	EP1928006	1/20/2010	MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING MODULE SERIALLY STACKABLE WITH OTHER SUCH MODULES TO MEET A VOLTAGE RATING	Dolby Intellectual Property Licensing, LLC	Expired
205374-IT-10	Italy	11/26/2007	7121542	IT1928006	1/20/2010	MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING MODULE SERIALLY STACKABLE WITH OTHER SUCH MODULES TO MEET A VOLTAGE RATING	Dolby Intellectual Property Licensing, LLC	Expired
205979-US-1	United States of America	5/16/2007	11/749316	US20080288132A1		METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
205979-CN-3	China	8/7/2008	2.0081E+11	CN101643037		METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
205979-EP-4	European Patent	8/5/2008	8161865.4	EP2151362	10/10/2012	METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
205979-JP-5	Japan	8/5/2008	2008-201398			METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
205979-KR-6	Korea, Republic of (KR)	8/18/2008	1.02008E+12	KR1020100021753A		METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
205979-EP-7	European Patent	7/3/2012	12174839.6	EP2583874		METHOD OF OPERATING VEHICLE AND ASSOCIATED SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
207792-CA-8	Canada	9/18/2008	2639584			System with circuitry for suppressing arc formation in micro-electromechanical system based switch$$	Dolby Intellectual Property Licensing, LLC	Expired
207792-CN-9	China	10/6/2008	2.0081E+11	CN101404220A		SYSTEM WITH CIRCUITRY FOR SUPPRESSING ARC FORMATION IN MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
207792-EP-10	European Patent	9/16/2008	8164432	EP2045823	8/16/2017	System with circuitry for suppressing arc formation in micro-electromechanical system based switch	Dolby Intellectual Property Licensing, LLC	Expired
208273-CN-2	China	12/23/2009	2.0091E+11	CN200910261931.6	9/3/2014	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
208273-EP-3	European Patent	12/8/2009	9178261.5	EP2202734		DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired

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208273-JP-4	Japan	12/22/2009	2009-289979	JP5749885	5/22/2015	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
208273-KR-5	Korea, Republic of (KR)	12/23/2009	1.02009E+12	KR10-1593232	2/2/2016	DATA STORAGE DEVICES AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
215038-CN-2	China	12/6/2007	2.0071E+11	CN200710196923.9	6/20/2012	ELECTROMECHANICAL SWITCHING CIRCUITRY IN PARALLEL WITH SOLID STATE SWITCHING CIRCUITRY	Dolby Intellectual Property Licensing, LLC	Expired
215038-EP-3	European Patent	11/26/2007	7121476.1	EP1930922	8/9/2017	Electromechanical Switching Circuitry In Parallel With Solid State Switching Circuitry Selectively Switchable To Carry A Load Current Appropriate To Such Circuitry	Dolby Intellectual Property Licensing, LLC	Expired
215575-CN-2	China	1/11/2008	2.0081E+11	CN200810002899.5	12/26/2012	GATING VOLTAGE CONTROL SYSTEM AND METHOD FOR ELECTROSTATICALLY ACTUATING A MICRO-ELECTROMECHANICAL DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
215575-MX-6	Mexico	1/10/2008	2008/000525	MX276522	6/10/2010	GATING VOLTAGE CONTROL SYSTEM AND METHOD FOR ELECTROSTATICALLY ACTUATING A MICRO-ELECTROMECHANICAL DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
216634-WO-2	Patent Cooperation Treaty	2/13/2008	PCT/US2008/001862	WO2008100517		RED LINE EMITTING PHOSPHORS FOR USE IN LED APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
216634-EP-6	European Patent	2/13/2008	8725487.6			NEW RED LINE EMITTING PHOSPHORS FOR USE IN LED APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
216634-KR-11	Korea, Republic of (KR)	2/13/2008	1.02018E+12	KR10-2017-0048603		NEW RED LINE EMITTING PHOSPHORS FOR USE IN LED APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
219867-US-1	United States of America	9/9/2008	61/095380			COMPOSITION, ENERGY STORAGE DEVICE, AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219867-US-3	United States of America	12/9/2008	12/330735			METHOD OF MAKING AND USING COMPOSITION AND ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
219867-US-4	United States of America	12/9/2008	12/330752			ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-WO-5	Patent Cooperation Treaty	8/27/2009	US09/55136	WO2010/030510		ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-AU-6	Australia	8/27/2009	2009251226			ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-BR-7	Brazil	8/27/2009	PI0905373-5			ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-EP-9	European Patent	8/27/2009	9791978.1	EP2335308		ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-IN-10	India	8/27/2009	1355/DELNP/2011	IN1355DELNP2011		ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-JP-11	Japan	8/27/2009	2011-526114	JP2012502430		ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired

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219867-RU-12	Russian Federation	8/27/2009	2011108407			ENERGY STORAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-CN-14	China	8/27/2009	2.013IE-11	CN103219500A		COMPOSITION ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-1	United States of America	12/19/2006	60/870843			ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-2	United States of America	6/15/2007	11/763787			COPPER-BASED ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-WO-4	Patent Cooperation Treaty	11/20/2007	US07/85243	WO2008079563		COPPER-BASED ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-5	United States of America	5/28/2009	12/473353			ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-6	United States of America	5/28/2009	12/473361			ENERGY STORAGE DEVICE AND SYSTEM (AS AMENDED JULY 30, 2012)	Dolby Intellectual Property Licensing, LLC	Expired
219868-AU-7	Australia	11/20/2007	2007338533	AU2007338533	8/16/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-CH-8	Switzerland	11/20/2007	00925/09	CH698359	5/31/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-CN-9	China	11/20/2007	2.0078E-11	CN101563797A		COPPER-BASED ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-JP-10	Japan	11/20/2007	2009-543005	JP2010514142		ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-CH-11	Switzerland		2072/10	CH704630	9/28/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219868-CN-12	China	11/20/2007	2.011IE-11			ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
219869-WO-2	Patent Cooperation Treaty	5/7/2008	US08/62843			ENERGY STORAGE DEVICE AND CELL CONFIGURATION THEREFOR	Dolby Intellectual Property Licensing, LLC	Expired
220217-WO-2	Patent Cooperation Treaty	3/17/2008	US08/57192	WO2008/137215		SYSTEM AND METHOD FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220217-CN-3	China	3/17/2008	2.0088E-11	CN200880014904.2	11/13/2013	SYSTEM AND METHOD FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220217-EP-4	European Patent	3/17/2008	8743951.9	EP2135513		SYSTEM AND METHOD FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220217-JP-5	Japan	3/17/2008	2010-507492	JP5271351	5/17/2013	SYSTEM AND METHOD FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220219-WO-2	Patent Cooperation Treaty	3/17/2008	US08/57188			SYSTEM AND METHOD FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220219-EP-4	European Patent	3/17/2008	8732331.7	EP2147475	11/29/2017	SYSTEM FOR COOLING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220778-CA-2	Canada	12/11/2008	2647126			MEMS SWITCH WITH IMPROVED STANDOFF VOLTAGE CONTROL	Dolby Intellectual Property Licensing, LLC	Expired

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220778-EP-4	European Patent	12/12/2008	8171425.5	EP2073238	11/1/2017	MEMS SWITCH WITH IMPROVED STANDOFF VOLTAGE CONTROL	Dolby Intellectual Property Licensing, LLC	Expired
220787-CA-2	Canada	12/4/2008	2645834			MEMS MICROSWITCH HAVING A CONDUCTIVE MECHANICAL STOP	Dolby Intellectual Property Licensing, LLC	Expired
220787-EP-4	European Patent	12/11/2008	8171380.2	EP2073236	3/2/2011	MEMS MICROSWITCH HAVING A CONDUCTIVE MECHANICAL STOP	Dolby Intellectual Property Licensing, LLC	Expired
220787-DE-8	Germany (Federal Republic of)	12/11/2008	6.02008E+11	DE2073236	3/2/2011	MEMS MICROSWITCH HAVING A CONDUCTIVE MECHANICAL STOP	Dolby Intellectual Property Licensing, LLC	Expired
220787-GB-9	United Kingdom	12/11/2008	8171380.2	GB2073236	3/2/2011	MEMS MICROSWITCH HAVING A CONDUCTIVE MECHANICAL STOP	Dolby Intellectual Property Licensing, LLC	Expired
220822-CA-2	Canada	10/16/2008	2641190			SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-CN-3	China	10/31/2008	2.0081E+11	CN200810173971.0	11/27/2013	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-EP-4	European Patent	10/24/2008	8167469.9	EP2056325	9/7/2011	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-FR-7	France	10/24/2008	8167469.9	FR2056325	9/7/2011	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-DE-8	Germany (Federal Republic of)	10/24/2008	8167469.9	DE200800950 2.9	9/7/2011	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-GB-9	United Kingdom	10/24/2008	8167469.9	GB2056325	9/7/2011	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220822-IT-10	Italy	10/24/2008	8167469.9	IT2056325	9/7/2011	SYSTEM AND METHOD FOR AVOIDING CONTACT STICTION IN MICROELECTROMECHANICAL SYSTEM BASED SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
220832-CA-2	Canada	10/9/2008	2640827			SEALED WAFER PACKAGING OF MICROELECTROMECHANICAL SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
220832-JP-5	Japan	10/10/2008	2008-263310			SEALED WAFER PACKAGING OF MICROELECTROMECHANICAL SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
220832-KR-6	Korea, Republic of (KR)	10/15/2008	2008-0100976			SEALED WAFER PACKAGING OF MICROELECTROMECHANICAL SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
220832-MX-7	Mexico	10/14/2008	MX/a/2008/013274			SEALED WAFER PACKAGING OF MICROELECTROMECHANICAL SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired

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220887-WO-2	Patent Cooperation Treaty	6/20/2007	US07/71644			A MEMS Microswitch Bypass and Protection System for Variable Frequency HVAC Drives	Dolby Intellectual Property Licensing, LLC	Expired
220887-EP-4	European Patent	6/20/2007	7798805.3	EP2171363	8/12/2015	MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING IN HEATING-VENTILATION-AIR-CONDITIONING SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
221845-WO-2	Patent Cooperation Treaty	6/20/2007	US07/71624			Arcless MEMS Microswitch DC Interrupter	Dolby Intellectual Property Licensing, LLC	Expired
221845-EP-4	European Patent	6/15/2007	7798799.8	EP2162897	2/27/2013	MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
221845-KR-6	Korea, Republic of (KR)	12/15/2009	2009-7026190	KRWO08/153574		MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
222841-US-1	United States of America	6/22/2007	60/945715			PROCESS FOR PREPARATION OF METAL OXIDES	Dolby Intellectual Property Licensing, LLC	Expired
222841-IN-6	India	10/31/2008	2472/DEL/2008			METAL OXIDE COATINGS	Dolby Intellectual Property Licensing, LLC	Expired
224610-WO-2	Patent Cooperation Treaty	6/20/2007	PCT/US07/014363	WO2008156449		RESETTABLE MEMS MICRO-SWITCH ARRAY BASED ON CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224610-EP-4	European Patent	6/20/2007	7796290	EP2162891	8/12/2015	RESETTABLE MEMS MICRO-SWITCH ARRAY BASED ON CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224610-JP-5	Japan	6/20/2007	2010-513168	JP5002708	5/25/2012	RESETTABLE MEMS MICRO-SWITCH ARRAY BASED ON CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-WO-2	Patent Cooperation Treaty	6/20/2007	US07/14379	WO2008/153530		REMOTE-OPERABLE MICRO-ELECTROMECHANICAL SYSTEM BASED OVER-CURRENT PROTECTION APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-EP-4	European Patent	6/20/2007	7835836.3	EP2162964	3/21/2018	REMOTE-OPERABLE MICRO-ELECTROMECHANICAL SYSTEM BASED OVER-CURRENT PROTECTION APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-KR-6	Korea, Republic of (KR)	6/20/2007	1.0201E+12	KR10201002148 1A		REMOTE-OPERABLE MICRO-ELECTROMECHANICAL SYSTEM BASED OVER-CURRENT PROTECTION APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
225009-WO-4	Patent Cooperation Treaty	4/10/2008	US08/59839			PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
225009-WO-5	Patent Cooperation Treaty	4/10/2008	US08/59840	WO2008/137247		METHOD OF OPERATING PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
225009-WO-6	Patent Cooperation Treaty	4/10/2008	US08/59843	WO2008/137248		ELECTRIC DRIVE VEHICLE RETROFIT SYSTEM AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225009-AU-12	Australia	4/10/2008	2008247962			METHOD OF OPERATING PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired

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225009-JP-15	Japan	4/10/2008	2010-507499	JP2010527222		METHOD OF OPERATING PROPULSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
225009-EP-19	European Patent	4/10/2008	8745450	EP2146864		ELECTRIC DRIVE VEHICLE RETROFIT SYSTEM AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225009-JP-20	Japan	4/10/2008	2010-507500	JPWO08137 2248		ELECTRIC DRIVE VEHICLE RETROFIT SYSTEM AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225009-EP-32	European Patent	4/10/2008	19199165.2	EP3640066		ELECTRIC DRIVE VEHICLE RETROFIT SYSTEM AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-CN-2	China	9/30/2009	2.0091E+11	CN101714668A		ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-EP-3	European Patent	10/2/2009	9172049	EP2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-JP-4	Japan	10/6/2009	2009-232063	JP2010092856		ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-FI-5	Finland	10/2/2009	9172049	FI2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-FR-6	France	10/2/2009	9172049	FR2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-DE-7	Germany (Federal Republic of)	10/2/2009	9172049	DE2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-GB-8	United Kingdom	10/2/2009	9172049	GB2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-IT-9	Italy	10/2/2009	9172049	IT2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-ES-10	Spain	10/2/2009	9172049	ES2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-SE-11	Sweden	10/2/2009	9172049	SE2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225349-CH-12	Switzerland	10/2/2009	9172049	CH2178150	6/20/2012	ENERGY STORAGE DEVICE AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225533-WO-2	Patent Cooperation Treaty	7/14/2009	US09/50438	WO2010021792		SEAL RING AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225533-AU-3	Australia	7/14/2009	2009283103			SEAL RING AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
225533-EP-5	European Patent	7/14/2009	9790350.4	EP2327118	4/22/2015	SEAL RING AND ASSOCIATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
226798-EP-3	European Patent	11/7/2008	8168549.7	EP2065770	1/9/2013	PROGRAMMABLE LOGIC CONTROLLER HAVING	Dolby Intellectual Property Licensing, LLC	Expired
226798-DE-7	Germany (Federal	11/7/2008	8168549.7	DE602008021499.0	1/9/2013	PROGRAMMABLE LOGIC CONTROLLER HAVING	Dolby Intellectual Property Licensing, LLC	Expired
226798-GB-9	United Kingdom	11/7/2008	8168549.7	GB2065770	1/9/2013	PROGRAMMABLE LOGIC CONTROLLER HAVING	Dolby Intellectual Property Licensing, LLC	Expired
226798-IT-10	Italy	11/7/2008	8168549.7	IT2065770	1/9/2013	PROGRAMMABLE LOGIC CONTROLLER HAVING	Dolby Intellectual Property Licensing, LLC	Expired

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226893-DE-1	Germany (Federal Republic of)	10/11/2007	200704903635	DE200704903635	1/13/2011	THERMAL CONDUCTION WITH THE AID OF A WEDGE TO COMPENSATE TOLERANCES	Dolby Intellectual Property Licensing, LLC	Expired
226893-WO-2	Patent Cooperation Treaty	10/10/2008	PCT/EP2008/063683	WO 2009/050130		THERMAL CONDUCTION WITH THE AID OF A WEDGE TO COMPENSATE TOLERANCES	Dolby Intellectual Property Licensing, LLC	Expired
227091-WO-2	Patent Cooperation Treaty	4/21/2009	PCT/US09/041184	WO2009142860		COMPOSITE ARTICLE AND RELATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227091-EP-4	European Patent	4/21/2009	9736780.9	EP2307332		COMPOSITE ARTICLE AND RELATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227568-US-1	United States of America	7/16/2007	60/949960			RED LINE EMITTING COMPLEX FLUORIDE PHOSPHORS ACTIVATED WITH Mn4+	Dolby Intellectual Property Licensing, LLC	Expired
227731-WO-2	Patent Cooperation Treaty	11/14/2008	US08/83584	WO09/08267		ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-AU-3	Australia	11/14/2008	2008340403			ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-EP-5	European Patent		8863617	EP2227837	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-JP-6	Japan	11/14/2008	2010-539564	JP2011508379		ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-ZA-7	South Africa	11/14/2008	2009/07832	ZA2009/07832	2/23/2011	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-CH-8	Switzerland		8863617	CH2227837	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-DE-9	Germany (Federal Republic of)		8863617	DE200801862 6.1	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-GB-10	United Kingdom		8863617	GB2227837	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-IT-11	Italy		8863617	IT2227837	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227731-FR-12	France		8863617	FR2227837	9/5/2012	ENERGY STORAGE DEVICE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
227889-EP-3	European Patent	10/24/2008	8167480.6	EP2056315	7/23/2014	MICRO-ELECTROMECHANICAL SYSTEM BASED SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
228276-EP-2	European Patent	7/30/2009	9166837.6	EP2154730		SOLAR CELL INCLUDING COOLING CHANNELS AND METHOD FOR FABRICATION	Dolby Intellectual Property Licensing, LLC	Expired
228276-JP-3	Japan	7/29/2009	2009-175958	JP2010045348		SOLAR CELL INCLUDING COOLING CHANNELS AND METHOD FOR FABRICATION	Dolby Intellectual Property Licensing, LLC	Expired
228365-WO-2	Patent Cooperation Treaty	12/16/2009	US09/068341	WO2010/078000		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired

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228365-US-3	United States of America	12/13/2010	12/966144	US8080823		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-CA-4	Canada	12/16/2009	2747440			DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-CN-5	China	12/16/2009	2.0098E+11	CN200980153821.6	11/12/2014	DISK STRUCTURE FOR BIT TYPE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-EP-6	European Patent	12/16/2009	9799452.9	EP2384511		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-IN-7	India	6/13/2011	4477/DELNP/2011	IN4477DELNP2011		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-JP-8	Japan	12/16/2009	2011-543581	JP2012514285		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-KR-9	Korea, Republic of (KR)	12/16/2009	1.02012E+12	KR10-1646297	8/1/2016	DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228583-EP-5	European Patent	9/4/2009	9169531.2	EP2164089	4/12/2017	MICRO-ELECTROMECHANICAL SWITCH PROTECTION IN SERIES PARALLEL TOPOLOGY	Dolby Intellectual Property Licensing, LLC	Expired
229967-CA-2	Canada	12/10/2009	2688117			MICRO-ELECTROMECHANICAL SYSTEM SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
229968-EP-4	European Patent	12/11/2008	8171381	EP2073237	10/19/2016	MEMS MICROSWITCH HAVING A DUAL ACTUATOR AND SHARED GATE	Dolby Intellectual Property Licensing, LLC	Expired
230521-GB-1	United Kingdom	1/25/2007	701370.9	GB2445972	12/29/2010	CATHODE FOR AN ELECTROCHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
230521-WO-2	Patent Cooperation Treaty	1/23/2008	GB08/000239	WO2008/090344		CATHODE FOR AN ELECTROCHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
230537-US-1	United States of America	8/28/2009	12/549877	US20110052968A1		BATTERY PACK ASSEMBLY AND RELATED PROCESSES	Dolby Intellectual Property Licensing, LLC	Expired
230537-WO-2	Patent Cooperation Treaty	7/13/2010	US10/41766	WO2011/025594		BATTERY PACK ASSEMBLY AND RELATED PROCESSES	Dolby Intellectual Property Licensing, LLC	Expired
230537-EP-4	European Patent	7/13/2010	10732610	EP2471124		BATTERY PACK ASSEMBLY AND RELATED PROCESSES	Dolby Intellectual Property Licensing, LLC	Expired
232258-EP-4	European Patent	4/25/2012	12165462.8	EP2518745		Switching Array Having Circuitry to Adjust a Temporal Distribution of a Gating Signal Applied to the Array	Dolby Intellectual Property Licensing, LLC	Expired
232258-JP-5	Japan	4/25/2012	2012-099356	JP2012238586		Switching Array Having Circuitry to Adjust a Temporal Distribution of a Gating Signal Applied to the Array	Dolby Intellectual Property Licensing, LLC	Expired
232260-WO-2	Patent Cooperation Treaty	3/2/2010	US10/25851	WO2010/126648		CATHODE COMPOSITION AND ELECTROCHEMICAL CELL COMPRISING SAME	Dolby Intellectual Property Licensing, LLC	Expired
232652-WO-2	Patent Cooperation Treaty	7/2/2009	US09/49537	WO2010/011484		METHOD AND SYSTEM FOR CONTROL OF A VEHICLE ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired

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232652-JP-6	Japan	1/24/2011	2011-520074			METHOD AND SYSTEM FOR CONTROL OF A VEHICLE ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
232737-JP-4	Japan	12/1/2009	2009-273096	JP20101366 14		AUXILIARY DRIVE APPARATUS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
232802-EP-3	European Patent	1/18/2010	10150930.5	EP2213502		MODULAR AUXILIARY POWER UNIT ASSEMBLY FOR AN ELECTRIC VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
232802-JP-4	Japan	1/20/2010	2010-009602	JP20101736 30		MODULAR AUXILIARY POWER UNIT ASSEMBLY FOR AN ELECTRIC VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
233619-EP-2	European Patent	3/23/2010	10157266.7	EP2236370	5/16/2018	APPARATUS AND METHOD FOR ADVANCED ANTI-SKID BRAKE AND TRACTION CONTROLS	Dolby Intellectual Property Licensing, LLC	Expired
233635-US-2	United States of America	1/27/2010	12/694820	US2010/031 0456		IMAGING OF MYELIN BASIC PROTEIN	Dolby Intellectual Property Licensing, LLC	Expired
233635-WO-3	Patent Cooperation Treaty	6/3/2010	US10/37237	WO 2010/141704		IMAGING OF MYELIN BASIC PROTEIN	Dolby Intellectual Property Licensing, LLC	Expired
233635-EP-8	European Patent	6/3/2010	10728034.9	EP2437792	10/21/2015	AGENTS AND METHODS FOR THE IMAGING OF MYELIN BASIC PROTEIN	Dolby Intellectual Property Licensing, LLC	Expired
234422-EP-3	European Patent	8/2/2010	10171544.9	EP2315227		SWITCH STRUCTURES	Dolby Intellectual Property Licensing, LLC	Expired
234422-JP-4	Japan	8/9/2010	2010-178239	JP20110403 85		SWITCH STRUCTURES	Dolby Intellectual Property Licensing, LLC	Expired
234422-EP-6	European Patent		19164314.7			SWITCH STRUCTURES	Dolby Intellectual Property Licensing, LLC	Expired
234577-JP-3	Japan	2/16/2010	2010-030787	JP20101889 94		ELECTRICALLY DRIVEN POWER TAKE-OFF SYSTEM AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
234828-US-2	United States of America	6/2/2020	16/889,902			SYSTEM AND METHOD FOR VEHICLE TEMPERATURE CONTROL	Dolby Intellectual Property Licensing, LLC	Expired
235141-US-1	United States of America	3/17/2009	12/405861	US20100240 491A1		SYSTEM FOR VEHICLE PROPULSION HAVING AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235141-EP-4	European Patent	3/15/2010	10156536.4	EP2230145		SYSTEM FOR VEHICLE PROPULSION HAVING AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235141-IN-5	India	3/3/2010	462/DEL/2010			SYSTEM FOR VEHICLE PROPULSION HAVING AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235141-JP-7	Japan	3/1/2016	2016-038524			SYSTEM FOR VEHICLE PROPULSION HAVING AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235150-EP-5	European Patent	10/14/2009	9173009.3	EP2179882		APPARATUS FOR ENERGY TRANSFER USING CONVERTER AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235152-KR-7	Korea, Republic of (KR)	8/24/2016	1.02016E+12			Method and Apparatus for Energy Transfer using DC-DC Power Electronics and Machine Inductance	Dolby Intellectual Property Licensing, LLC	Expired
235655-EP-2	European Patent	9/22/2010	10178461.9	EP2306580	5/20/2015	COMPOSITION AND ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired

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235714-WO-2	Patent Cooperation Treaty		US10/48750	WO2011/056297		CATHODE COMPOSITIONS COMPRISING ZN AND CHALCOGENIDE AND ENERGY STORAGE CELL COMPRISING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235783-AU-2	Australia	7/22/2010	2010203140			PROTECTIVE COATING COMPOSITIONS AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
235783-EP-4	European Patent	7/20/2010	10170065.6	EP2302006	11/28/2012	PROTECTIVE COATING COMPOSITIONS AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
236159-US-2	United States of America	2/25/2010	12/712457	US8206984		PRESEALED ANODE TUBE	Dolby Intellectual Property Licensing, LLC	Expired
236639-CN-2	China	8/31/2010	2.0101E+11	CN102005222B	7/23/2014	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-EP-3	European Patent	8/19/2010	10173473.9	EP2290408	8/15/2012	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-JP-4	Japan	8/20/2010	2010-184512	JP5738554	5/1/2015	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-KR-5	Korea, Republic of (KR)	8/30/2010	1.0201E+12	KR102011023822A		COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-TW-6	Taiwan	8/30/2010	99129150	TWI500025	9/11/2015	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-DE-8	Germany (Federal Republic of)	8/19/2010	10173473.9	DE2290408	8/15/2012	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-GB-9	United Kingdom	8/19/2010	10173473.9	GB2290408	8/15/2012	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-NL-10	Netherlands	8/19/2010	10173473.9	NL2290408	8/15/2012	COMPOSITIONS, OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE OPTICAL DATA STORAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236909-EP-3	European Patent	7/6/2010	10168517	EP2273520		TRANSFORMER ON-LOAD TAP CHANGER USING MEMS TECHNOLOGY	Dolby Intellectual Property Licensing, LLC	Expired
237446-US-1	United States of America	9/16/2009	61/242819			METHOD AND SYSTEM FOR CONTACTLESS FINGERPRINT DETECTION AND VERIFICATION	Dolby Intellectual Property Licensing, LLC	Expired
237714-EP-4	European Patent	3/28/2011	11160074.8	EP2434614	6/19/2013	CONTROL DISTRIBUTION TRANSFORMER AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
237735-WO-2	Patent Cooperation Treaty	6/18/2010	US10/39122	WO2011/025574		ELECTROCHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
237851-EP-3	European Patent	3/28/2011	11160077.1	EP2371646	11/29/2017	APPARATUS FOR HYBRID DRIVE TORQUE CONTROL	Dolby Intellectual Property Licensing, LLC	Expired

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237934-US-1	United States of America	8/18/2009	12/542760	US20100139733A1		FUSED WIRING HARNESS FOR A PHOTOVOLTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-AU-2	Australia	8/18/2010	2010212421			FUSED WIRING HARNESS FOR A PHOTOVOLTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-CN-3	China	8/18/2010	2.0101E+11	CN101997241A		FUSED WIRING HARNESS FOR A PHOTOVOLTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-EP-4	European Patent	8/3/2010	10171761.9	EP2287915	1/9/2013	FUSED WIRING HARNESS FOR A PHOTOVOLTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-EP-5	European Patent	5/6/2011	11165079.2	EP2392553	8/24/2016	DIELECTRIC MATERIALS FOR POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-SG-8	Singapore	5/12/2011	201103421-2	SG176379		DIELECTRIC MATERIALS FOR POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-EP-11	European Patent	5/6/2011	11165080	EP2386531	11/9/2016	DIELECTRIC MATERIALS FOR POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238346-EP-3	European Patent	8/2/2010	10171542.3	EP2288000		APPARATUS AND METHOD FOR BEARING	Dolby Intellectual Property Licensing, LLC	Expired
238407-EP-2	European Patent	8/19/2010	10173474.7	EP2290650	11/28/2012	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-TW-3	Taiwan	8/19/2010	99127813	TWI524337	3/1/2016	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-CN-4	China	8/31/2010	201010277335.X	CN201010277335.X	5/13/2015	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-JP-5	Japan	8/24/2010	2010-186776	JP5496823	3/14/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-KR-6	Korea, Republic of (KR)	8/30/2010	1.0201E+12	KR10-1716500	3/8/2017	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-DE-8	Germany (Federal Republic of)	8/19/2010	10173474.7	DE602010003810.6	11/28/2012	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-FR-9	France	8/19/2010	10173474.7	FR2290650	11/28/2012	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-GB-10	United Kingdom	8/19/2010	10173474.7	GB2290650	11/28/2012	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238413-EP-3	European Patent	1/28/2011	11152533.3	EP2355096		HANDOFFS BETWEEN DIFFERENT VOICE ENCODER SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
238414-EP-3	European Patent	3/8/2011	11157344	EP2365712		HANDOFF METRIC FOR MULTIPLE TRANSMISSION TECHNOLOGIES	Dolby Intellectual Property Licensing, LLC	Expired
238727-WO-2	Patent Cooperation Treaty	11/10/2010	PCT/US10/56099	WO2011/081717		ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
238789-EP-3	European Patent	11/19/2010	10191932.2	EP2328160	2/28/2018	SWITCH STRUCTURES	Dolby Intellectual Property Licensing, LLC	Expired
238794-EP-3	European Patent	9/17/2010	10177345.5	EP2315221	11/14/2012	SWITCH STRUCTURE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
238794-JP-4	Japan	9/9/2010	2010-201497	JP2011091029		SWITCH STRUCTURE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired

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238794-GB-8	United Kingdom	9/17/2010	10177345.5	GB2315221	11/14/2012	SWITCH STRUCTURE AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
239040-EP-3	European Patent	12/14/2010	10194998	EP2337183	7/23/2014	APPARATUS AND METHOD FOR RAPID CHARGING USING SHARED POWER ELECTRONICS	Dolby Intellectual Property Licensing, LLC	Expired
239040-IN-5	India	12/14/2010	3822/CHE/2010	IN2010CH03822		APPARATUS AND METHOD FOR RAPID CHARGING USING SHARED POWER ELECTRONICS	Dolby Intellectual Property Licensing, LLC	Expired
239040-US-14	United States of America	7/26/2022	17/873,357			APPARATUS AND METHOD FOR RAPID CHARGING USING SHARED POWER ELECTRONICS	Dolby Intellectual Property Licensing, LLC	Expired
239053-EP-3	European Patent	4/4/2011	11160945.9	EP2375620	6/8/2016	DIVISION FREE DUPLEXING NETWORKS	Dolby Intellectual Property Licensing, LLC	Expired
239322-EP-3	European Patent	8/20/2010	10173623.9	EP2290810	6/25/2014	SYSTEM AND METHOD FOR NON-SINUSOIDAL CURRENT WAVEFORM EXCITATION OF ELECTRICAL MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
239382-EP-3	European Patent	6/22/2011	11170924.2	EP2403129	8/13/2014	SYSTEM AND METHOD FOR NON-SINUSOIDAL CURRENT WAVEFORM EXCITATION OF ELECTRICAL GENERATORS	Dolby Intellectual Property Licensing, LLC	Expired
239382-JP-5	Japan	6/22/2011	2011-137895	JP2012016267		SYSTEM AND METHOD FOR NON-SINUSOIDAL CURRENT WAVEFORM EXCITATION OF ELECTRICAL GENERATORS	Dolby Intellectual Property Licensing, LLC	Expired
239449-IN-5	India	8/13/2010	1911/DEL/2010	IN1911DEL2010		APPARATUS FOR TRANSFERRING ENERGY USING ONBOARD POWER ELECTRONICS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
239451-EP-3	European Patent	7/14/2011	11173959.5	EP2410639	6/11/2014	HIGH POWER-DENSITY, HIGH EFFICIENCY, NON-PERMANENT MAGNET ELECTRIC MACHINE	Dolby Intellectual Property Licensing, LLC	Expired
241038-JP-4	Japan	12/26/2011	2011-282553	JP2012142934		POWER SWITCHING SYSTEM INCLUDING A MICROELECTROMECHANICAL SYSTEM (MEMS) ARRAY	Dolby Intellectual Property Licensing, LLC	Expired
241400-CN-2	China	4/20/2011	2.0111E+11	CN102298952	3/16/2016	ENERGY AND SPACE EFFICIENT DETECTION FOR DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
241400-EP-3	European Patent	4/13/2011	11162301.3	EP2381447		ENERGY AND SPACE EFFICIENT DETECTION FOR DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
241400-JP-4	Japan	4/14/2011	2011-089658	JP2011227985		ENERGY AND SPACE EFFICIENT DETECTION FOR DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
241400-KR-5	Korea, Republic of (KR)	4/20/2011	1.02011E+12	KR1020111117616A		ENERGY AND SPACE EFFICIENT DETECTION FOR DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
241400-TW-6	Taiwan	4/21/2011	100113939	TWI533296	5/11/2016	ENERGY AND SPACE EFFICIENT DETECTION FOR DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
241407-EP-3	European Patent	4/11/2011	11161812	EP2378731	3/30/2016	GENERALIZED DIVISION FREE DUPLEXING TECHNIQUES FOR DECREASING RENDEVOUS TIME	Dolby Intellectual Property Licensing, LLC	Expired

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241411-US-1	United States of America	3/22/2010	12/713361	US20110231155A1		DYNAMICALLY CONFIGURABLE SENSOR CHASSIS	Dolby Intellectual Property Licensing, LLC	Expired
241411-EP-3	European Patent	3/11/2011	11157805	EP2369748		DYNAMICALLY CONFIGURABLE SENSOR CHASSIS	Dolby Intellectual Property Licensing, LLC	Expired
241411-KR-4	Korea, Republic of (KR)	3/21/2011	1.02011E+12	KR102011106239A		DYNAMICALLY CONFIGURABLE SENSOR CHASSIS	Dolby Intellectual Property Licensing, LLC	Expired
241497-EP-3	European Patent	12/10/2010	10194449.4	EP2337043	3/30/2016	SWITCH STRUCTURE AND ASSOCIATED CIRCUIT	Dolby Intellectual Property Licensing, LLC	Expired
241826-EP-3	European Patent	2/24/2011	11155784.9	EP2362525		ROTOR STRUCTURE FOR INTERIOR PERMANENT MAGNET ELECTROMOTIVE MACHINE	Dolby Intellectual Property Licensing, LLC	Expired
241845-EP-3	European Patent	6/14/2011	11169822.1	EP2398028	8/12/2015	MEMS SWITCHING ARRAY HAVING A SUBSTRATE	Dolby Intellectual Property Licensing, LLC	Expired
242485-WO-2	Patent Cooperation Treaty	3/16/2012	PCT/US2012/029326	WO2012129061		SYSTEM AND METHOD FOR CONTACTLESS POWER TRANSFER IN IMPLANTABLE DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
242903-EP-3	European Patent	10/31/2011	11187315.4	EP2450927	1/4/2017	MEMS-BASED SWITCHING SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
243942-BR-2	Brazil	10/31/2011	PI1104288-5	BR1104288		LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-EP-4	European Patent	11/15/2011	11189255	EP2456066	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-JP-6	Japan	11/16/2011	2011-250219	JP2012115134		LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-DE-7	Germany (Federal Republic of)	11/15/2011	11189255	DE602011046224.5	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-FR-8	France	11/15/2011	11189255	FR2456066	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-GB-9	United Kingdom	11/15/2011	11189255	GB2456066	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-IT-10	Italy	11/15/2011	5.02018E+14	IT2456066	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243942-ES-11	Spain	11/15/2011	11189255	ES2456066	3/7/2018	LOW-INDUCTANCE, HIGH-EFFICIENCY INDUCTION MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243944-JP-6	Japan	11/14/2011	2011-248140	JP2012115133		HIGH POWER-DENSITY, HIGH BACK EMF PERMANENT MAGNET MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired

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243944-US-8	United States of America	5/19/2017	15/600086	US20170257050		HIGH POWER-DENSITY, HIGH BACK EMF PERMANENT MAGNET MACHINE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243956-US-1	United States of America	11/19/2010	12/949862	US20120126728A1		INTEGRATED ELECTRIC MACHINE AND SILICON CARBIDE POWER CONVERTER ASSEMBLY AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243956-BR-2	Brazil	11/10/2011	PI 1105062-4	BRPI1105062		INTEGRATED ELECTRIC MACHINE AND SILICON CARBIDE POWER CONVERTER ASSEMBLY AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243956-EP-4	European Patent	11/15/2011	11189253.5	EP2456054		INTEGRATED ELECTRIC MACHINE AND SILICON CARBIDE POWER CONVERTER ASSEMBLY AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243956-IN-5	India	11/18/2011	3298/DEL/2011	IN3298/DEL/2011		INTEGRATED ELECTRIC MACHINE AND SILICON CARBIDE POWER CONVERTER ASSEMBLY AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243956-JP-6	Japan	11/16/2011	2011-250220	JP2012115135		INTEGRATED ELECTRIC MACHINE AND SILICON CARBIDE POWER CONVERTER ASSEMBLY AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
243963-SE-5	Sweden	5/20/2011	1150471-9			High Speed Self-Cascaded Electric Machines	Dolby Intellectual Property Licensing, LLC	Expired
244088-WO-2	Patent Cooperation Treaty	6/29/2011	US11/42322	WO12/21222		RECHARGEABLE ELECTROCHEMICAL CELL AND METHOD OF MANUFACTURING A RECHARGEABLE ELECTROCHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
244092-EP-3	European Patent	7/26/2012	12178134.8	EP2551866	4/2/2014	ELECTRICAL DISRIBUTION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
244092-DE-5	Germany (Federal Republic of)	7/26/2012	12178134.8	DE2551866	4/2/2014	ELECTRICAL DISRIBUTION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
244295-BR-2	Brazil	4/15/2011	PI1101994-8	BRPI1101994		AUTOMATIC ERROR CONTROL SCHEME SELECTION FOR FIXED-LENGTH MESSAGES BASED UPON MESSAGE PAYLOAD SIZE	Dolby Intellectual Property Licensing, LLC	Expired
244295-CA-3	Canada	3/31/2011	2735762			AUTOMATIC ERROR CONTROL SCHEME SELECTION FOR FIXED-LENGTH MESSAGES BASED UPON MESSAGE PAYLOAD SIZE	Dolby Intellectual Property Licensing, LLC	Expired
245295-CA-2	Canada	12/1/2011	2760215			OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-CN-3	China	12/14/2011	2.011E+11	CN102592613	8/31/2016	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-EP-4	European Patent	12/6/2011	11192101.1	EP2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-JP-5	Japan	11/24/2011	2011-255656	JP5903252	3/18/2016	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired

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245295-KR-6	Korea, Republic of (KR)	12/13/2011	1.02011E+12	KR102012066596A		OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-TW-7	Taiwan	12/6/2011	100144926	TWI536377	6/1/2016	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-DE-8	Germany (Federal Republic of)	12/6/2011	11192101.1	DE2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-GB-9	United Kingdom	12/6/2011	11192101.1	GB2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-NL-10	Netherlands	12/6/2011	11192101.1	NL2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-FR-11	France	12/6/2011	11192101.1	FR2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
245295-NO-12	Norway	12/6/2011	11192101.1	NO2466582	2/26/2014	OPTICAL DATA STORAGE MEDIA AND METHODS FOR USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
246897-WO-2	Patent Cooperation Treaty	9/10/2012	PCT/US12/054405	WO2013048704		ELECTROCHEMICAL CELLS	Dolby Intellectual Property Licensing, LLC	Expired
246939-BR-2	Brazil	12/22/2011	PI 1105336-4	BRPI 1105336		ELECTRIC MOTOR STRUCTURE TO ELECTRO-MAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246939-CN-4	China	12/23/2011	2.0111E+11	CN102545446A		ELECTRIC MOTOR STRUCTURE TO MINIMIZE ELECTRO-MAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246939-EP-5	European Patent	12/15/2011	11193656.3	EP2469687		ELECTRIC MOTOR STRUCTURE TO MINIMIZE ELECTRO-MAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246939-IN-6	India	12/16/2011	3680/DEL/2011	IN3680/DEL/2011		ELECTRIC MOTOR STRUCTURE TO MINIMIZE ELECTRO-MAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246939-JP-7	Japan	12/20/2011	2011-277762	JP2012135199		ELECTRIC MOTOR STRUCTURE TO MINIMIZE ELECTRO-MAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246939-CN-8	China	3/22/2018	2.0181E+11	CN108574359		ELECTRIC MOTOR STRUCTURE TO MINIMIZE ELECTROMAGNETIC INTERFERENCE	Dolby Intellectual Property Licensing, LLC	Expired
246995-US-2	United States of America	12/7/2012	13/708436	US20130149590A1		AN ALKALI METAL-METAL HALIDE BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
247243-WO-2	Patent Cooperation Treaty	11/29/2011	US11/62275	WO 2012/087495		COMPOSITION, ENERGY STORAGE DEVICE, AND RELATED PROCESSES	Dolby Intellectual Property Licensing, LLC	Expired
247255-IN-4	India	4/13/2012	1135/DEL/2012	IN1135DEL2012		SYSTEM, METHOD, AND APPARATUS FOR RESOLVING ERRORS IN A SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
247550-US-1	United States of America	9/30/2011	13/250680	US20130084486A1		ELECTROCHEMICAL CELLS INCLUDING A CONDUCTIVE MATRIX	Dolby Intellectual Property Licensing, LLC	Expired

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247550-WO-2	Patent Cooperation Treaty	9/10/2012	PCT/US12/054422			ELECTROCHEMICAL CELLS INCLUDING A CONDUCTIVE MATRIX	Dolby Intellectual Property Licensing, LLC	Expired
248221-SG-4	Singapore	3/22/2012	201202096-2	SG184683		APPARATUS AND METHOD FOR CONTACTLESS HIGH RESOLUTION HANDPRINT CAPTURE	Dolby Intellectual Property Licensing, LLC	Expired
248986-US-1	United States of America	11/30/2011	13/307262	US20130134018A1		A MICRO-ELECTROMECHANICAL SWITCH AND A RELATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
248986-WO-2	Patent Cooperation Treaty	10/25/2012	PCT/US2012/061820	WO2013081746		A MICRO-ELECTROMECHANICAL SWITCH AND A RELATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
248986-JP-5	Japan	10/25/2012	2014-544738	JP2015501069		A MICRO-ELECTROMECHANICAL SWITCH AND A RELATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
249074-EP-4	European Patent	1/16/2013	13151418.4	EP2617688	5/2/2018	SEALING GLASS COMPOSITION AND ARTICLE	Dolby Intellectual Property Licensing, LLC	Expired
249090-EP-2	European Patent	9/26/2013	13186251.8	EP2713379	12/20/2017	A SWITCHING APPARATUS INCLUDING GATING CIRCUITRY FOR ACTUATING MICRO-ELECTROMECHANICAL SYSTEM MEMS SWITCHES	Dolby Intellectual Property Licensing, LLC	Expired
249187-US-1	United States of America	5/27/2011	13/117542			BATTERY CELL DESIGN AND METHOD OF COOLING BATTERY CELLS	Dolby Intellectual Property Licensing, LLC	Expired
249391-WO-2	Patent Cooperation Treaty	3/20/2013	PCT/US2013/033062	WO2013142553		SYSTEM AND METHOD FOR ISLANDING DETECTION AND PROTECTION	Dolby Intellectual Property Licensing, LLC	Expired
250286-CN-2	China	4/27/2012	2.0121E+11	CN103377382A		OPTIMUM GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250286-DE-3	Germany (Federal Republic of)	4/27/2012	1.02012E+11	DE102012103738		OPTIMAL GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250286-GB-4	United Kingdom	4/17/2012	1206744.3	GB2501270		OPTIMAL GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250286-JP-5	Japan	4/24/2012	2012-098291	JP5933097	6/17/2016	OPTIMAL GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250286-KR-6	Korea, Republic of (KR)	4/27/2012	1.02012E+12	KR10201312360A		OPTIMAL GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250455-US-1	United States of America	12/30/2011	13/341052	US20130171487A1		RECHARGEABLE BATTERY AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
250455-CN-2	China	12/31/2012	2.01221E+11	CN201220744711.6	11/20/2013	RECHAREGABLE BATTERY AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
250455-EP-6	European Patent	12/18/2012	12197725	EP2610943	2/15/2017	RECHAREGABLE BATTERY AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
250744-CN-2	China	12/28/2012	2.01221E+11	CN201220737334.3	12/4/2013	RECHARGEABLE BATTERY SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
250841-BR-2	Brazil	8/10/2012	BR102012020046-5	BR102012020046		SYSTEM AND METHOD FOR DEPTH FROM DEFOCUS IMAGING	Dolby Intellectual Property Licensing, LLC	Expired
251009-US-1	United States of America	11/30/2011	13/308386	US20130138499A1		USAGE MEASURENT TECHNIQUES AND SYSTEMS FOR INTERACTIVE ADVERTISING	Dolby Intellectual Property Licensing, LLC	Expired
251009-CN-4	China	11/30/2012	2.01211E+11	CN103137046A		USAGE MEASURENT TECHNIQUES AND SYSTEMS FOR INTERACTIVE ADVERTISING	Dolby Intellectual Property Licensing, LLC	Expired
251344-US-1	United States of America	8/30/2011	13/221896	US20130054377A1		PERSON TRACKING AND INTERACTIVE ADVERTISING	Dolby Intellectual Property Licensing, LLC	Expired
251344-DE-3	Germany (Federal Republic of)	6/29/2012	1.02012E+11	DE102012105754		PERSON TRACKING AND INTERACTIVE ADVERTISING	Dolby Intellectual Property Licensing, LLC	Expired
251344-US-7	United States of America	6/10/2019	16/436,583	US-2019-0311661-A1		PERSON TRACKING AND INTERACTIVE ADVERTISING	Dolby Intellectual Property Licensing, LLC	Expired
251485-WO-2	Patent Cooperation Treaty	9/11/2012	PCT/US12/054541	WO2013039848		THERMAL MANAGEMENT DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
252223-WO-2	Patent Cooperation Treaty	12/5/2012	US12/67864	WO2013101411		METHOD AND SYSTEM FOR CONTROLLING ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
252382-IN-5	India	8/1/2012	2380/DEL/2012	IN2380DEL2012		APPARATUS AND METHOD FOR CHARGING AN ELECTRIC VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
252665-EP-2	European Patent	11/7/2012	12191698.5	EP2592747	3/7/2018	METHOD AND SYSTEM FOR CONTROLLING MOTOR	Dolby Intellectual Property Licensing, LLC	Expired
252995-US-1	United States of America	5/30/2012	13/483841			ACTIVE BRAZE TECHNIQUES ON BETA-ALUMINA	Dolby Intellectual Property Licensing, LLC	Expired
253755-WO-2	Patent Cooperation Treaty	2/15/2013	PCT/US2013/026496	WO2013123433		NEGATIVE SEQUENCE CURRENT COMPENSATION CONTROLLER AND METHOD FOR POWER CONVERSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
254472-WO-2	Patent Cooperation Treaty	1/10/2013	US13/20989	WO2013115950		ELECTRODE COMPOSITIONS, ENERGY STORAGE DEVICES AND RELATED METHODS	Dolby Intellectual Property Licensing, LLC	Expired
254472-EP-3	European Patent	1/10/2013	13701179.7	EP2810323	5/30/2018	ELECTRODE COMPOSITIONS, ENERGY STORAGE DEVICES AND RELATED METHODS	Dolby Intellectual Property Licensing, LLC	Expired
254566-WO-2	Patent Cooperation Treaty	4/24/2013	PCT/US2013/037927	WO2013163266		SYSTEM AND METHOD FOR OPEN-CIRCUIT FAULT DETECTION	Dolby Intellectual Property Licensing, LLC	Expired
254869-US-1	United States of America	10/25/2011	61/551047			Integrated Power System Control Method and Related Apparatus with Energy Storage Element	Dolby Intellectual Property Licensing, LLC	Expired
254869-EP-5	European Patent	10/22/2012	12189424	EP2587607	7/12/2017	Integrated Power System Control Method and Related Apparatus with Energy Storage Element	Dolby Intellectual Property Licensing, LLC	Expired

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254869-IN-7	India	10/1/2012	3080/DEL/2012	IN3080DEL2012		Integrated Power System Control Method and Related Apparatus with Energy Storage Element	Dolby Intellectual Property Licensing, LLC	Expired
254993-WO-2	Patent Cooperation Treaty	12/7/2012	PCT/US2012/068550	WO2013101435		MODULAR HIGH TEMPERATURE BATTERY ELECTRICAL CONFIGURATIONS	Dolby Intellectual Property Licensing, LLC	Expired
256606-US-1	United States of America	5/25/2012	61/651817			COMPOSITIONS FOR BRAZING, AND RELATED METHODS AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
256606-US-3	United States of America	8/31/2012	13/600333	US20130316226A1		BRAZE COMPOSITIONS, AND RELATED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
256606-CN-4	China	5/24/2013	2.0131E+11	CN103418932		BRAZE COMPOSITIONS, AND RELATED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
256606-CN-12	China	5/24/2013	2.0131E+11	CN103418931		BRAZE COMPOSITIONS, AND RELATED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
256606-KR-16	Korea, Republic of (KR)	5/22/2013	1.02013E+12	KR1020131322293A		BRAZE COMPOSITIONS, AND RELATED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
256606-US-17	United States of America	9/6/2018	16/124,120	US20190001445		BRAZE COMPOSITIONS, AND RELATED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
257085-US-1	United States of America	5/23/2012	61/650890			ENERGY STORAGE CELL AND METHOD OF ASSEMBLY	Dolby Intellectual Property Licensing, LLC	Expired
257472-US-1	United States of America	11/16/2011	61/560580			METHOD FOR REMODELING OF ELECTRIC VEHICLE ADOPTION	Dolby Intellectual Property Licensing, LLC	Expired
257472-WO-3	Patent Cooperation Treaty	11/16/2012	PCT/US12/065414	WO2013/074864		METHOD AND SYSTEM FOR ELECTRIC VEHICLE ADOPTION SIMULATION WITH REASONING	Dolby Intellectual Property Licensing, LLC	Expired
257939-WO-2	Patent Cooperation Treaty	6/28/2013	PCT/US2013/048500	WO2014018220		OPEN CIRCUIT VOLTAGE CHECKING FOR A BATTERY SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
259236-US-1	United States of America	9/13/2012	61/700490			ACTION BASED VIDEO SUMMARIZATION FOR CONVENIENCE STORES	Dolby Intellectual Property Licensing, LLC	Expired
259236-WO-3	Patent Cooperation Treaty	9/12/2013	PCT/US2013/059478	WO2014043359		SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired
259236-AU-4	Australia	9/12/2013	2013315497			SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired
259236-BR-5	Brazil	9/12/2013	112015005543-5			SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired
259236-CN-6	China	9/12/2013	2.0138E+11	CN104823438		SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired
259236-EP-7	European Patent	9/12/2013	13770576	EP2896199		SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired
259236-AU-11	Australia	9/12/2013	2017206244			SYSTEM AND METHOD FOR GENERATING AN ACTIVITY SUMMARY OF A PERSON	Dolby Intellectual Property Licensing, LLC	Expired

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259236-AU-12	Australia	9/12/2013	2019213309			ACTION BASED VIDEO SUMMARIZATION FOR CONVENIENCE STORES	Dolby Intellectual Property Licensing, LLC	Expired
259278-EP-3	European Patent	5/16/2013	13168098.5	EP2667396	1/6/2016	CONTACTOR ISOLATION METHOD AND APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
259422-IN-5	India	5/15/2013	1446/DEL/2013	IN1446DEL2013		SYSTEM FOR TRANSFERRING ENERGY FROM AN ENERGY SOURCE AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
260416-US-1	United States of America	10/19/2012	61/715906			Wireless Feeler Gauge	Dolby Intellectual Property Licensing, LLC	Expired
260416-WO-3	Patent Cooperation Treaty	10/11/2013	PCT/US2013/064446	WO2014062484		DIGITAL FEELER GAUGE AND METHOD OF USING SAME	Dolby Intellectual Property Licensing, LLC	Expired
261519-EP-2	European Patent	11/12/2013	13192515.8	EP2731190		COMPOSITION, ENERGY STORAGE DEVICE, AND RELATED PROCESS	Dolby Intellectual Property Licensing, LLC	Expired
261528-EP-6	European Patent	9/23/2013	13185598.3	EP2712073		POWER CONVERSION SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
262057-CN-1	China	9/24/2012	2.012IE+11	CN103660967A		MOBILE TRANSPORTATION EQUIPMENT WITH IMPROVED ENERGY SUPPLYING MECHANISM AND MOBILE TRANSPORTATION METHOD	Dolby Intellectual Property Licensing, LLC	Expired
263939-US-1	United States of America	11/2/2012	61/721743			ENGINE COOLING SYSTEM AND METHOD FOR AN ENGINE	Dolby Intellectual Property Licensing, LLC	Expired
263939-CN-2	China	11/1/2013	2.01321E+11	CN201320686392.2	7/9/2014	ENGINE COOLING SYSTEM FOR AN ENGINE	Dolby Intellectual Property Licensing, LLC	Expired
264203-US-2	United States of America	3/10/2014	14/202674	US20140277884A1		DRIVE SYSTEM AND METHOD FOR DRIVING A VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
264203-IN-5	India	3/12/2014	1286/CHE/2014			DRIVE SYSTEM AND METHOD FOR DRIVING A VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
264203-BR-6	Brazil	3/7/2014	1020140053115	BR102014005311		DRIVE SYSTEM AND METHOD FOR DRIVING A VEHICLE	Dolby Intellectual Property Licensing, LLC	Expired
264291-US-1	United States of America	9/13/2012	61/700542			SITUATIONAL AWARENESS FOR GAS STATIONS AND SIMILAR COMMERCIAL SITES OF INTEREST	Dolby Intellectual Property Licensing, LLC	Expired
264291-WO-3	Patent Cooperation Treaty	9/12/2013	PCT/US2013/059453	WO2014043340		SYSTEM AND METHOD FOR GENERATING SEMANTIC ANNOTATIONS	Dolby Intellectual Property Licensing, LLC	Expired
264291-BR-5	Brazil	9/12/2013	1120150055419			SYSTEM AND METHOD FOR GENERATING SEMANTIC ANNOTATIONS	Dolby Intellectual Property Licensing, LLC	Expired
264291-EP-8	European Patent	9/12/2013	13770747.7	EP2895987		SYSTEM AND METHOD FOR GENERATING SEMANTIC ANNOTATIONS	Dolby Intellectual Property Licensing, LLC	Expired
264323-US-1	United States of America	11/2/2012	61/721712			BATTERY MANAGEMENT SYSTEMS AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
264353-TW-2	Taiwan	11/29/2013	102143918	TW201432676		STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired

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264353-WO-3	Patent Cooperation Treaty	11/22/2013	PCT/US13/71362	WO2014088834		STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
264353-JP-5	Japan	11/22/2013	2015-546501			STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
264353-EP-6	European Patent	11/22/2013	13805656.9	EP2929534		STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
264353-KR-7	Korea, Republic of (KR)	11/22/2013	10-2015-7018081			STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
264353-CN-8	China	11/22/2013	2.0138E+11	CN104903960		STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
264353-CA-9	Canada	11/22/2013	2893842			STACKED FILM REFLECTIVE LAYERS FOR MULTI-LAYER OPTICAL DATA STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
265784-JP-5	Japan	8/4/2014	2014-158297	JP2015-033329		SPOKE PERMANENT MAGNET MACHINE WITH REDUCED TORQUE RIPPLE AND METHOD OF MANUFACTURING THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
265784-CN-7	China	8/5/2014	2.01812E+11	CN11022456 7X		SPOKE PERMANENT MAGNET MACHINE WITH REDUCED TORQUE RIPPLE AND METHOD OF MANUFACTURING THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
265951-WO-2	Patent Cooperation Treaty	10/26/2015	PCT/US15/57308	WO2016089504		MULTICHANNEL RELAY ASSEMBLY WITH IN LINE MEMS SWITCHES	Dolby Intellectual Property Licensing, LLC	Expired
265951-JP-7	Japan	10/26/2015	2017-528881			MULTICHANNEL RELAY ASSEMBLY WITH IN LINE MEMS SWITCHES	Dolby Intellectual Property Licensing, LLC	Expired
265951-KR-8	Korea, Republic of (KR)	10/26/2015	10-2017-7018313	KR10-2017-0090485		MULTICHANNEL RELAY ASSEMBLY WITH IN LINE MEMS SWITCHES	Dolby Intellectual Property Licensing, LLC	Expired
266269-CN-3	China	10/17/2014	2.01411E+11	CN104578472		TORQUE RIPPLE REDUCTION IN ELECTRIC MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
266269-EP-4	European Patent	10/17/2014	14189355.2	EP2863518		TORQUE RIPPLE REDUCTION IN ELECTRIC MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
266269-JP-5	Japan	10/16/2014	2014-211282	JP2015-080403		TORQUE RIPPLE REDUCTION IN ELECTRIC MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
266271-EP-3	European Patent	11/3/2014	14191515.7	EP2869529	8/31/2016	SYSTEMS AND METHODS FOR SECURE FILE TRANSFERS	Dolby Intellectual Property Licensing, LLC	Expired
267009-WO-2	Patent Cooperation Treaty	9/29/2014	PCT/US2014/058038	WO2015048639		SYSTEM AND METHOD FOR DETERMINING A HYDRATION LEVEL OF A TISSUE REGION	Dolby Intellectual Property Licensing, LLC	Expired
267351-EP-3	European Patent	7/10/2014	14176572.7	EP2849112		SYSTEMS AND METHODS FOR DATA LOSS PREVENTION	Dolby Intellectual Property Licensing, LLC	Expired
267351-IN-5	India	7/14/2014	3477/CHE/2014			SYSTEMS AND METHODS FOR DATA LOSS PREVENTION	Dolby Intellectual Property Licensing, LLC	Expired
267819-US-5	United States of America	11/1/2016	15/340131	US20170054335A1		SYSTEM AND METHOD FOR SMOOTHING A SALIENT ROTOR IN ELECTRICAL MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
267847-EP-2	European Patent	7/21/2014	14177828.2	EP2830182	9/6/2017	ISOLATED BATTERY MANAGEMENT SYSTEMS AND METHODS THEREOF	Dolby Intellectual Property Licensing, LLC	Expired

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268047-EP-2	European Patent	8/5/2014	14179835.5	EP2840422		PLASMONIC INTERFACE AND METHOD OF MANUFACTURING THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
268047-KR-5	Korea, Republic of (KR)	8/19/2014	1.02014E+12			PLASMONIC INTERFACE AND METHOD OF MANUFACTURING THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
268047-CA-6	Canada	8/14/2014	2859421			PLASMONIC INTERFACE AND METHOD OF MANUFACTURING THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
268102-US-1	United States of America	7/26/2013	13/951979	US20150030901A1		BATTERY HEATER SYSTEMS AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
268102-CN-2	China	7/25/2014	2.014IE+11	CN104347912		BATTERY HEATER SYSTEMS AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
268102-EP-3	European Patent	7/23/2014	14178108.8	EP2830186	12/6/2017	BATTERY HEATER SYSTEMS AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
268102-JP-4	Japan	7/23/2014	2014-149347			BATTERY HEATER SYSTEMS AND METHODS	Dolby Intellectual Property Licensing, LLC	Expired
269205-JP-2	Japan	9/16/2014	2014-187259			IMPROVED APPARATUS AND METHOD FOR ELECTRIC BRAKING	Dolby Intellectual Property Licensing, LLC	Expired
269205-US-3	United States of America	9/16/2014	14/487731	US20150081152A1		IMPROVED APPARATUS AND METHOD FOR ELECTRIC BRAKING	Dolby Intellectual Property Licensing, LLC	Expired
269545-WO-2	Patent Cooperation Treaty	9/4/2014	PCT/US2014/053982	WO2015053885		METHODS AND SYSTEMS FOR A UNIVERSAL WIRELESS PLATFORM FOR ASSET MONITORING	Dolby Intellectual Property Licensing, LLC	Expired
269545-JP-5	Japan	9/4/2014	2016-519847			METHODS AND SYSTEMS FOR A UNIVERSAL WIRELESS PLATFORM FOR ASSET MONITORING	Dolby Intellectual Property Licensing, LLC	Expired
269545-CN-7	China	9/4/2014	2.0148E+11	CN105794180		METHODS AND SYSTEMS FOR A UNIVERSAL WIRELESS PLATFORM FOR ASSET MONITORING	Dolby Intellectual Property Licensing, LLC	Expired
269575-WO-2	Patent Cooperation Treaty	1/9/2015	PCT/US2015/010817	WO2015/108778		PLATELET ACTIVATION AND GROWTH FACTOR RELEASE USING ELECTRIC PULSES	Dolby Intellectual Property Licensing, LLC	Expired
269603-WO-2	Patent Cooperation Treaty	11/20/2014	PCT/US2014/066484	WO2015/108619		ELECTRIC PULSE GENERATION SYSTEMS USING CAPACITIVE COUPLING	Dolby Intellectual Property Licensing, LLC	Expired
269603-CN-10	China	11/20/2014	2.0148E+11	CN105899654		ELECTRIC PULSE GENERATION SYSTEMS USING CAPACITIVE COUPLING	Dolby Intellectual Property Licensing, LLC	Expired
271055-KR-3	Korea, Republic of (KR)	5/19/2015	1.02015E+12			THERMAL CLAMP APPARATUS FOR ELECTRONICS SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
271055-CN-4	China	5/22/2015	2.0151E+11	CN105101747		THERMAL CLAMP APPARATUS FOR ELECTRONICS SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
271261-CN-3	China	5/22/2015	2.0151E+11	CN105130486		METHOD FOR JOINING CERAMIC TO METAL, AND SEALING STRUCTURE THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
271471-US-2	United States of America	10/27/2015	14/924288	US20160118848A1		PERMANENT MAGNET MACHINE	Dolby Intellectual Property Licensing, LLC	Expired

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271474-WO-2	Patent Cooperation Treaty	7/21/2016	PCT/US2016/043319	WO2017039863		ENERGY STORAGE DEVICE WITH REDUCED TEMPERATURE VARIABILITY BETWEEN CELLS	Dolby Intellectual Property Licensing, LLC	Expired
272354-US-1	United States of America	10/9/2013	61/889025			WIRELESS TAPER GAUGE AND METHOD OF USING SAME	Dolby Intellectual Property Licensing, LLC	Expired
272805-US-1	United States of America	2/20/2014	61/942199			CONTROL METHOD FOR REDUCING TORQUE RIPPLE IN SWITCHED RELUCTANCE MOTORS	Dolby Intellectual Property Licensing, LLC	Expired
273156-CN-2	China	12/1/2016	2.01611E+11	CN106893694		ERYTHROCYTE AGGREGATION AND LEUKOCYTE ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
273156-EP-3	European Patent	11/28/2016	16200924.5	EP3176579		ERYTHROCYTE AGGREGATION AND LEUKOCYTE ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
273156-JP-4	Japan	11/29/2016	2016-230727			ERYTHROCYTE AGGREGATION AND LEUKOCYTE ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
273252-EP-2	European Patent	1/28/2015	15152810.6	EP2913217		VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
273252-BR-6	Brazil	1/13/2015	102015000762-0	BR102015000762		VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
273252-EP-11	European Patent	1/28/2015	19181302.1	EP3613625		VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
273252-JP-12	Japan	1/21/2015	2019-116125	JP2019-163060		VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	Dolby Intellectual Property Licensing, LLC	Expired
273345-US-6	United States of America	12/20/2017	15/848823	US20180134170A1		VEHICLE PROPULSION SYSTEM HAVING AN ENERGY STORAGE SYSTEM AND OPTIMIZED METHOD OF CONTROLLING OPERATION THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
274610-EP-6	European Patent	1/11/2016	16150804.9	EP3046242		BI-DIRECTIONAL DC-DC POWER CONVERTER FOR A VEHICLE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
274698-US-1	United States of America	3/17/2014	61/954182			SYSTEM ARCHITECTURE FOR WIRELESS METROLOGICAL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
274698-WO-3	Patent Cooperation Treaty	2/23/2015	PCT/US2015/017009	WO2015142477		SYSTEM ARCHITECTURE FOR WIRELESS METROLOGICAL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
274698-EP-7	European Patent	2/23/2015	15709003.6	EP3120254		SYSTEM ARCHITECTURE FOR WIRELESS METROLOGICAL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
274984-WO-2	Patent Cooperation Treaty	6/23/2015	PCT/US2015/037155	WO2015/200307		INTEGRATED MICRO-ELECTROMECHANICAL SWITCHES AND A RELATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
275094-IN-4	India	1/14/2016	2.01644E+11			VEHICLE DRIVING SYSTEM AND ENERGY CONTROL METHODS	Dolby Intellectual Property Licensing, LLC	Expired
275094-EP-6	European Patent	1/13/2016	16151031.8	EP3043344		VEHICLE DRIVING SYSTEM AND ENERGY CONTROL METHODS	Dolby Intellectual Property Licensing, LLC	Expired

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275150-US-2	United States of America	11/16/2016	15/352759	US20170070154A1		MULTI-LEVEL DC-DC CONVERTER WITH GALVANIC ISOLATION AND ADAPTIVE CONVERSION RATIO	Dolby Intellectual Property Licensing, LLC	Expired
275327-WO-2	Patent Cooperation Treaty	7/13/2016	PCT/US16/041954	WO2017058335		REFRACTORY SEED METAL FOR ELECTROPLATED MEMS STRUCTURES	Dolby Intellectual Property Licensing, LLC	Expired
277187-WO-2	Patent Cooperation Treaty	4/5/2016	PCT/US16/25990	WO2017176253		ACTIVATED PLATELET COMPOSITON WITH TUNABLE GROWTH FACTOR LEVEL	Dolby Intellectual Property Licensing, LLC	Expired
277201-EP-2	European Patent	12/12/2016	16203484.7	EP3182332		SYSTEMS AND METHODS FOR HAIR SEGMENTATION	Dolby Intellectual Property Licensing, LLC	Expired
277298-WO-2	Patent Cooperation Treaty	2/2/2016	PCT/US16/16075	WO2016140752		ELECTROMECHANICAL SYSTEM SUBSTRATE ATTACHMENT FOR REDUCED THERMAL DEFORMATION	Dolby Intellectual Property Licensing, LLC	Expired
277298-KR-10	Korea, Republic of (KR)	2/2/2016	10-2022-7029006			ELECTROMECHANICAL SYSTEM SUBSTRATE ATTACHMENT FOR REDUCED THERMAL DEFORMATION	Dolby Intellectual Property Licensing, LLC	Expired
277870-EP-2	European Patent	12/4/2015	15197958	EP3032216	11/1/2017	METHOD AND APPARATUS FOR MEASURING THICKNESS OF AN OBJECT	Dolby Intellectual Property Licensing, LLC	Expired
278163-WO-2	Patent Cooperation Treaty	2/19/2016	PCT/US16/18583	WO2016190929		ZINC-BASED ELECTROLYTE COMPOSITIONS, AND RELATED ELECTROCHEMICAL PROCESSES AND ARTICLES	Dolby Intellectual Property Licensing, LLC	Expired
278961-CN-2	China	7/22/2016	2.01611E+11	CN106374749		CIRCUITS AND METHODS FOR SYNCHRONOUS RECTIFICATION IN RESONANT CONVERTERS	Dolby Intellectual Property Licensing, LLC	Expired
279301A-WO-2	Patent Cooperation Treaty	7/21/2016	PCT/US16/43282	WO2017039861		RADIO FREQUENCY MICRO-ELECTROMECHANICAL SYSTEMS HAVING INVERTED MICROSTRIP TRANSMISSION LINES AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
279412-WO-2	Patent Cooperation Treaty	7/27/2016	PCT/US16/44241	WO2017044195		ENERGY STORAGE DEVICE HAVING IMPROVED THERMAL PERFORMANCE	Dolby Intellectual Property Licensing, LLC	Expired
279748-US-1	United States of America	10/7/2015	14/876892	US20170104244A1		POSITIVE ELECTRODE COMPOSITION FOR OVERDISCHARGE PROTECTION	Dolby Intellectual Property Licensing, LLC	Expired
279748-WO-2	Patent Cooperation Treaty	10/3/2016	PCT/US16/55106	WO2017062297		POSITIVE ELECTRODE COMPOSITION FOR OVERDISCHARGE PROTECTION	Dolby Intellectual Property Licensing, LLC	Expired
279748-EP-5	European Patent	10/3/2016	16781963	EP3360183		POSITIVE ELECTRODE COMPOSITION FOR OVERDISCHARGE PROTECTION	Dolby Intellectual Property Licensing, LLC	Expired
279758-WO-2	Patent Cooperation Treaty	9/9/2016	PCT/US2016/50883	WO2017069861		AUXILIARY CIRCUIT FOR MICRO-ELECTROMECHANICAL SYSTEM RELAY CIRCUIT	Dolby Intellectual Property Licensing, LLC	Expired
279759-WO-2	Patent Cooperation Treaty	10/18/2016	PCT/US16/057483	WO2017070086		MICRO-ELECTROMECHANICAL SYSTEM RELAY CIRCUIT	Dolby Intellectual Property Licensing, LLC	Expired

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279765-WO-2	Patent Cooperation Treaty	10/18/2016	PCT/US16/57509	WO2017070103		ISOLATED CONTROL CIRCUIT AND DRIVER FOR MICRO-ELECTROMECHANICAL SYSTEM SWITCH	Dolby Intellectual Property Licensing, LLC	Expired
280212-WO-2	Patent Cooperation Treaty	7/21/2016	PCT/US16/43279	WO2017039860		BATTERY MANAGEMENT SYSTEM AND POWER CONNECTOR	Dolby Intellectual Property Licensing, LLC	Expired
280467-CN-1	China	3/31/2015	201510148732.X	CN106143171A		MULTI-SOURCE ENERGY STORAGE SYSTEM AND ENERGY MANAGEMENT AND CONTROL METHOD	Dolby Intellectual Property Licensing, LLC	Expired
280514-CN-1	China	3/31/2015	2.0151E+11	CN106160206A		POWER SUPPLY SYSTEM AND ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
280514-EP-4	European Patent	3/30/2016	16162904.3	EP3078538		POWER GENERATING SYSTEM AND ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
280638-EP-2	European Patent	8/26/2016	16185846.9	EP3135527		HYBRID SYSTEM WITH MULTIPLE ENERGY STORAGE DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
280946-WO-2	Patent Cooperation Treaty	9/8/2016	PCT/US16/50706	WO2017044581		HEAT FLUX ASSEMBLY FOR AN ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired
281041-US-2	United States of America	3/30/2017	15/474405	US20170282310A1		EUTECTIC BRAZING COMPOSITIONS, AND RELATED PROCESSES AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
281127-WO-2	Patent Cooperation Treaty	7/20/2016	PCT/US16/43035	WO2017030724		SYSTEMS AND METHODS TO SAMPLE CURRENT MEASUREMENTS IN ENERGY STORAGE DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
281133-WO-2	Patent Cooperation Treaty	12/29/2016	PCT/US2016/069197	WO2017117385		Calcium controlled activation of platelets via electrical stimulation	Dolby Intellectual Property Licensing, LLC	Expired
282674-US-1	United States of America	10/30/2015	62/248784			METHODS, SYSTEMS, APPARATUS, AND STORAGE MEDIA FOR USE IN DETECTING ANOMALOUS BEHAVIOR AND/OR IN PREVENTING DATA LOSS	Dolby Intellectual Property Licensing, LLC	Expired
283249-US-1	United States of America	4/25/2016	62/327043			SLEEVE ROTOR SYNCHRONOUS RELUCTANCE MOTOR	Dolby Intellectual Property Licensing, LLC	Expired
283249-CN-5	China	4/25/2017	2.0171E+11	CN107370261		SLEEVE ROTOR SYNCHRONOUS RELUCTANCE ELECTRIC MACHINE	Dolby Intellectual Property Licensing, LLC	Expired
283282-WO-2	Patent Cooperation Treaty	11/10/2016	PCT/US16/061220	WO2017083452		VOLTAGE GROUPING OF ENERGY STORAGE UNITS	Dolby Intellectual Property Licensing, LLC	Expired
283283-WO-2	Patent Cooperation Treaty	11/2/2016	PCT/US16/060013	WO2017083144		ADJUSTABLE TAP LOCATION FOR ENERGY STORAGE CELLS	Dolby Intellectual Property Licensing, LLC	Expired
283495-CN-1	China	3/30/2016	201610192001.X	CN 107294145A		CHARGING DEVICE, SYSTEM AND METHOD	Dolby Intellectual Property Licensing, LLC	Expired
283516-US-7	United States of America	11/6/2019	16/675,703	US20200070643		INTEGRATED CHARGER FOR VEHICLES AND METHOD OF MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired

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283956-WO-2	Patent Cooperation Treaty	4/26/2017	PCT/US2017/029528	WO/2017/189658		POWER CONVERTER TOPOLOGY FOR USE IN AN ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
283956-EP-4	European Patent	4/26/2017	17721943.3	EP3449558		POWER CONVERTER TOPOLOGY FOR USE IN AN ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
283956-JP-6	Japan	4/26/2017	2018-555755			POWER CONVERTER TOPOLOGY FOR USE IN AN ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
283956-KR-7	Korea, Republic of (KR)	4/26/2017	1.02019E+12			POWER CONVERTER TOPOLOGY FOR USE IN AN ENERGY STORAGE SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
284050-IN-6	India	3/10/2017	2.01744E+11			TOPICAL APPLICATION OF NERVE LABELING DYES FOR IMAGE-GUIDED SURGERY	Dolby Intellectual Property Licensing, LLC	Expired
285698-EP-2	European Patent	5/2/2017	17168930	EP3242323		BRIDGE LEG CIRCUIT ASSEMBLY AND FULL-BRIDGE CIRCUIT ASSEMBLY	Dolby Intellectual Property Licensing, LLC	Expired
285699-CN-1	China	8/12/2016	201610666183.X	CN107732875A		SOLID STATE CIRCUIT BREAKER AND MOTOR DRIVING SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
285990-CN-4	China	2/3/2017	2.0171E+11	CN107040045		SYSTEM AND METHOD FOR PROTECTING A WIRELESS POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
287419-US-1	United States of America	1/25/2016	62/286482			Integrated, Low Cost Photo-Thermal Spectroscopy Reader and Method of Use	Dolby Intellectual Property Licensing, LLC	Expired
287419-TW-3	Taiwan	7/24/2017	106124769	TW201808228		FIXED OPTICS PHOTO-THERMAL SPECTROSCOPY READER AND METHOD OF USE	Dolby Intellectual Property Licensing, LLC	Expired
287419-WO-4	Patent Cooperation Treaty	7/21/2017	PCT/US2017/043217	WO2018/017921		FIXED OPTICS PHOTO-THERMAL SPECTROSCOPY READER AND METHOD OF USE	Dolby Intellectual Property Licensing, LLC	Expired
309222-US-1	United States of America	4/30/2010	61/330091			ROTATING ELECTRIC MACHINE, ESPECIALLY SYNCHRONOUS PERMANENT MAGNET MACHINE	Dolby Intellectual Property Licensing, LLC	Expired
309222-WO-3	Patent Cooperation Treaty	4/29/2011	PCT/EP2011/056813	WO2011135062		ROTATING ELECTRIC MACHINE, ESPECIALLY SYNCHRONOUS PERMANENT MAGNET MACHINE	Dolby Intellectual Property Licensing, LLC	Expired
313124-WO-2	Patent Cooperation Treaty	6/27/2017	PCT/US17/039537	WO2018005520		SYSTEM AND METHOD FOR FAULT INTERRUPTION WITH MEMS SWITCHES	Dolby Intellectual Property Licensing, LLC	Expired
314005-WO-2	Patent Cooperation Treaty	4/17/2018	PCT/US18/27849	WO2018195003		VEHICLE AND CONTROL METHOD THEREOF AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
314571-WO-2	Patent Cooperation Treaty	7/9/2018	PCT/US18/41222	WO2019/040190		Architecture for creating 3D model of an object using information from sparse point cloud as initialization parameter for space carving based method	Dolby Intellectual Property Licensing, LLC	Expired
314858-WO-2	Patent Cooperation Treaty	11/20/2017	PCT/US17/62613	WO2018111507		SYSTEM AND METHOD FOR LEAKAGE CURRENT AND FAULT LOCATION DETECTION IN ELECTRIC VEHICLE DC POWER CIRCUITS	Dolby Intellectual Property Licensing, LLC	Expired

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314859-WO-2	Patent Cooperation Treaty	10/20/2017	PCT/US17/57513	WO2018111400		DC LEAKAGE CURRENT DETECTOR AND METHOD OF OPERATION THEREOF FOR LEAKAGE CURRENT DETECTION IN DC POWER CIRCUITS	Dolby Intellectual Property Licensing, LLC	Expired
315022-EP-2	European Patent	12/15/2017	17207600.2	EP3336483		DIGITAL WIRELESS FEELER GAUGE	Dolby Intellectual Property Licensing, LLC	Expired
315022-CN-3	China	12/15/2017	2.01711E+11	CN108225199		DIGITAL WIRELESS FEELER GAUGE	Dolby Intellectual Property Licensing, LLC	Expired
315117-WO-2	Patent Cooperation Treaty	10/28/2017	PCT/US17/58907	WO2018111421		CHARGING PADS AND METHODS FOR CHARGING RECEIVER DEVICES HAVING DIFFERENT FREQUENCY STANDARDS	Dolby Intellectual Property Licensing, LLC	Expired
315233-US-1	United States of America	10/27/2016	62/413684			METHODS OF SYSTEMS OF GENERATING VIRTUAL MULTI-DIMENSIONAL MODELS USING IMAGE ANALYSIS	Dolby Intellectual Property Licensing, LLC	Expired
315233-WO-3	Patent Cooperation Treaty	10/27/2017	PCT/US2017/58825	WO2018081607		Methods for using synthetic data in deep-learning-based image analysis	Dolby Intellectual Property Licensing, LLC	Expired
315343A-WO-2	Patent Cooperation Treaty	1/12/2018	PCT/US2018/013499			SYSTEM AND METHOD FOR PREDICTING AN EXCITATION PATTERN OF A DEEP BRAIN STIMULATION	Dolby Intellectual Property Licensing, LLC	Expired
315343-WO-2	Patent Cooperation Treaty	1/12/2018	PCT/US2018/013498			SYSTEM AND METHOD FOR PREDICTING AN EXCITATION PATTERN OF A DEEP BRAIN STIMULATION	Dolby Intellectual Property Licensing, LLC	Expired
315659-WO-2	Patent Cooperation Treaty	10/27/2017	PCT/US2017/058641	WO2018111416		A CHARGING PAD AND A METHOD FOR CHARGING ONE OR MORE RECEIVER DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
316496-EP-2	European Patent	12/1/2017	17204871.2	EP3333764		TECHNIQUES FOR ASSESSING GROUP LEVEL COGNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-JP-3	Japan	11/22/2017	2017-224121			TECHNIQUES FOR ASSESSING GROUP LEVEL COGNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-CN-4	China	12/6/2017	2.01711E+11	CN108154236		TECHNIQUES FOR ASSESSING GROUP LEVEL COGNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-CA-5	Canada	11/22/2017	2986406			TECHNIQUES FOR ASSESSING GROUP LEVEL COGNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316767-WO-2	Patent Cooperation Treaty	2/6/2018	PCT/US18/16964	WO2018/160324		DRIVE SYSTEM AND METHOD OF OPERATION THEREOF FOR REDUCING DC LINK CURRENT RIPPLE	Dolby Intellectual Property Licensing, LLC	Expired
316772-WO-2	Patent Cooperation Treaty	3/16/2018	PCT/US2018/022999	WO2018212828		DUAL MAGNETIC PHASE MATERIAL RINGS FOR AC ELECTRIC MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
317124-EP-2	European Patent	10/2/2017	17194461.4	EP3333762		CROWD ANALYTICS VIA ONE SHOT LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-JP-3	Japan	9/25/2017	2017-183113			CROWD ANALYTICS VIA ONE SHOT LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-CN-4	China	10/9/2017	2.01711E+11	CN108154075		CROWD ANALYTICS VIA ONE SHOT LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-CA-5	Canada	9/28/2017	2980609			CROWD ANALYTICS VIA ONE SHOT LEARNING	Dolby Intellectual Property Licensing, LLC	Expired

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317707-WO-3	Patent Cooperation Treaty	8/9/2018	PCT/US2018/045888	WO/2019/060055		GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
317707-TW-11	Taiwan	9/6/2018	111103044	TW202235580		GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
318182-WO-2	Patent Cooperation Treaty	8/22/2018	PCT/US2018/047432	WO2019/040565		SYSTEM AND METHOD FOR RAPID CURRENT SENSING AND TRANSISTOR TIMING CONTROL	Dolby Intellectual Property Licensing, LLC	Expired
318542-WO-1	Patent Cooperation Treaty	8/31/2017	PCT/US2017/049682	WO/2019/045737		ENCODING VOLUMETRIC DATA TO SUPPORT TRUSTED TRANSACTION DELIVERY	Dolby Intellectual Property Licensing, LLC	Expired
318543-WO-1	Patent Cooperation Treaty	8/31/2017	PCT/US17/049685	WO/2019/045738		INTELLECTUAL PROPERTY EXCHANGE ECOSYSTEM FOR ADDITIVE MANUFACTURING	Dolby Intellectual Property Licensing, LLC	Expired
318580-WO-1	Patent Cooperation Treaty	8/31/2017	PCT/US2017/049677	WO/2019/045735		DISTRIBUTION OF CUSTOMIZED ENGINEERING MODELS FOR ADDITIVE MANUFACTURING	Dolby Intellectual Property Licensing, LLC	Expired
318587-WO-1	Patent Cooperation Treaty	8/31/2017	PCT/US17/049695	WO/2019/045739		BLOCKCHAIN ENABLED COLLABORATIVE TRANSACTION INFORMATION PROCESSING FOR A SUPPLY CHAIN	Dolby Intellectual Property Licensing, LLC	Expired
318587-KR-5	Korea, Republic of (KR)	8/31/2017	10-2020-7008969			BLOCKCHAIN ENABLED COLLABORATIVE TRANSACTION INFORMATION PROCESSING FOR A SUPPLY CHAIN	Dolby Intellectual Property Licensing, LLC	Expired
318738-US-1	United States of America	3/22/2017	62/477151			Inductive Electric Vehicle Charger	Dolby Intellectual Property Licensing, LLC	Expired
318738-WO-3	Patent Cooperation Treaty	3/22/2018	PCT/US18/23782	WO/2018/183083		SYSTEM AND METHOD FOR INDUCTIVE CHARGING WITH IMPROVED EFFICIENCY	Dolby Intellectual Property Licensing, LLC	Expired
318763-CN-1	China	1/2/2018	2.0181E+11	CN109995240A		POWER CONVERTER AND POWER CONVERTING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
319318-WO-2	Patent Cooperation Treaty	4/19/2018	PCT/US2018/028229	WO/2018/217336		A POWER TRANSFER DEVICE AND AN ASSOCIATED METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
319319-WO-2	Patent Cooperation Treaty	5/21/2018	PCT/US18/33652	WO/2018/222429		TRANSMITTING ASSEMBLY FOR A UNIVERSAL WIRELESS CHARGING DEVICE AND A METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
319335-US-1	United States of America	7/6/2017	62/529,165			ARTICLES FOR HIGH TEMPERATURE SERVICE AND RELATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
319335-WO-3	Patent Cooperation Treaty	6/11/2018	PCT/US18/36899	WO/2019/009984		ARTICLES FOR HIGH TEMPERATURE SERVICE AND RELATED METHOD	Dolby Intellectual Property Licensing, LLC	Expired
319620-WO-2	Patent Cooperation Treaty	8/21/2018	PCT/US18/47167	WO/2019/074580		TRUE TIME DELAY BEAM FORMER MODULE AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
319621-WO-2	Patent Cooperation Treaty	7/5/2018	PCT/US2018/040914	WO/2019/078933		TRUE TIME DELAY BEAM FORMER AND METHOD OF OPERATION	Dolby Intellectual Property Licensing, LLC	Expired

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319639-WO-2	Patent Cooperation Treaty	8/27/2018	PCT/US18/48090	WO/2019/078952		HIGH IMPEDANCE RF MEMS TRANSMISSION DEVICES AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
319927-WO-2	Patent Cooperation Treaty	9/14/2018	PCT/US2018/050984	WO/2019/083636		SYSTEM AND METHOD FOR PREVENTING PERMANENT MAGNET DEMAGNETIZATION IN ELECTRICAL MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
319927-KR-6	Korea, Republic of (KR)	9/14/2018	10-2020-7014544			SYSTEM AND METHOD FOR PREVENTING PERMANENT MAGNET DEMAGNETIZATION IN ELECTRICAL MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
320002-WO-2	Patent Cooperation Treaty	11/13/2018	PCT/US18/60589	WO/2019/099335		HIERARCHICAL DATA EXCHANGE MANAGEMENT SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
320128-US-1	United States of America	4/24/2017	62/488990			ADAPTIVE LINEAR LINKED PISTON ELECTRIC POWER GENERATOR	Dolby Intellectual Property Licensing, LLC	Expired
320128-WO-2	Patent Cooperation Treaty	4/23/2018	PCT/US2018/028828	WO2018200367		ADAPTIVE LINEAR LINKED PISTON ELECTRIC POWER GENERATOR	Dolby Intellectual Property Licensing, LLC	Expired
320128-EP-10	European Patent	4/23/2018	22163067.6	EP4063628		ADAPTIVE LINEAR LINKED PISTON ELECTRIC POWER GENERATOR	Dolby Intellectual Property Licensing, LLC	Expired
320529-WO-2	Patent Cooperation Treaty	3/18/2021	PCT/US2021/023009	WO/2021/188822		Analogy Engines for Grounding and Situational Awareness	Dolby Intellectual Property Licensing, LLC	Expired
320880-WO-2	Patent Cooperation Treaty	3/4/2019	PCT/US2019/020517	WO/2019/173197		SYSTEMS AND METHODS FOR WEARABLE VOLTAGE DETECTION DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
322985-WO-2	Patent Cooperation Treaty	2/25/2019	PCT/US19/19398	WO/2019/177764		INDUSTRIAL DATA VERIFICATION USING SECURE, DISTRIBUTED LEDGER	Dolby Intellectual Property Licensing, LLC	Expired
323537-WO-2	Patent Cooperation Treaty	2/20/2019	PCT/US2019/018747	WO/2019/164928		SYSTEM AND METHOD FOR ELECTRIC PULSE BASED ACTIVATION OF BIOLOGICAL SAMPLES	Dolby Intellectual Property Licensing, LLC	Expired
323953-WO-2	Patent Cooperation Treaty	2/19/2019	PCT/US2019/018455			SYSTEM AND METHOD FOR LOCALIZATION OF DEEP BRAIN STIMULATION ELECTRODE VIA MAGNETIC RESONANCE IMAGING	Dolby Intellectual Property Licensing, LLC	Expired
324595-WO-2	Patent Cooperation Treaty	1/15/2020	PCT/US2020/013585	WO/2020/154137		SYSTEMS AND METHODS FOR PREDICTING OPTIMAL DEEP BRAINSTIMULATION PARAMETERS	Dolby Intellectual Property Licensing, LLC	Expired
324680-WO-2	Patent Cooperation Treaty	9/25/2019	PCT/US2019/052938	WO/2020/068969		SYSTEM AND METHOD FOR A MAGNETICALLY COUPLED INDUCTOR BOOST AND MULTIPHASE BUCK CONVERTER WITH SPLIT DUTY CYCLE	Dolby Intellectual Property Licensing, LLC	Expired
324828-US-1	United States of America	11/28/2018	62/772,130			SYSTEM AND METHOD FOR SENSORLESS CONTROL OF ELECTRIC MACHINES AND REDUCTION OF NOISE AND VIBRATION ASSOCIATED THEREWITH	Dolby Intellectual Property Licensing, LLC	Expired

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324845-WO-3	Patent Cooperation Treaty	3/22/2019	PCT/US2019/023548	WO/2019/203990		RECEIVER UNIT OF A WIRELESS POWER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
326309-WO-2	Patent Cooperation Treaty	1/14/2020	PCT/US2020/013486	WO/2020/154133		BRAIN CONNECTIVITY ATLAS FOR PERSONALIZED FUNCTIONALNEUROSURGERY TARGETING AND BRAIN STIMULATION PROGRAMMING	Joint ownership - Dolby Intellectual Property Licensing, LLC and University Health Network	Expired
502201-WO-2	Patent Cooperation Treaty	4/20/2020	PCT/US2020/028946	WO/2020/236374		METHOD TO ENHANCE PHOSPHOR ROBUSTNESS AND DISPERSABILITY AND RESULTING PHOSPHORS	Dolby Intellectual Property Licensing, LLC	Expired
502615-WO-2	Patent Cooperation Treaty	1/15/2020	PCT/US2020/013589	WO/2020/154138		Automatic optimization of Deep Brain Stimulation parameters using functional MRI	Joint ownership - Dolby Intellectual Property Licensing, LLC and Albany Medical College	Expired
508774-US-1	United States of America	12/9/2019	62/945,830			LIGHT EMITTING DEVICES AND DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION AND METHODS FOR PRODUCING	Dolby Intellectual Property Licensing, LLC	Expired
508774-WO-2	Patent Cooperation Treaty	12/9/2020	PCT/US2020/063925	WO/2021/119073		LIGHT EMITTING DEVICES AND DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION AND METHODS FOR PRODUCING	Dolby Intellectual Property Licensing, LLC	Expired
509591-US-1	United States of America	5/20/2020	63/027,672			INK FORMULATIONS WITH NARROW BAND EMITTING PHOSPHOR MATERIALS	Dolby Intellectual Property Licensing, LLC	Expired
509591-US-2	United States of America	7/31/2020	63/059,709			INK FORMULATIONS WITH NARROW BAND EMITTING PHOSPHOR MATERIALS	Dolby Intellectual Property Licensing, LLC	Expired
509591-WO-3	Patent Cooperation Treaty	1/19/2021	PCT/US2021/013963	WO/2021/211181		INK FORMULATIONS WITH NARROW BAND EMITTING PHOSPHOR MATERIALS	Dolby Intellectual Property Licensing, LLC	Expired
509730-US-1	United States of America	4/14/2020	63/009,800			GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
509730-US-3	United States of America	9/1/2020	63/073,391			GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
509730-WO-4	Patent Cooperation Treaty	4/13/2021	PCT/US2021/027105	WO/2021/211600		GREEN-EMITTING PHOSPHORS AND DEVICES THEREOF	Dolby Intellectual Property Licensing, LLC	Expired
509746-WO-2	Patent Cooperation Treaty	7/16/2021	PCT/US2021/042085	WO/2022/020213		POWER CONTROLLER IN A WIRELESS POWER RECEPTION APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
602226-WO-2	Patent Cooperation Treaty	12/8/2021	PCT/US2021/062377	WO 2022/125644		PULSE WIDTH COMMUNICATION IN A WIRELESS POWER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
602751-US-1	United States of America	9/1/2020	63/073,386			DEVICES COMPATIBLE WITH NIGHT VISION EQUIPMENT	Dolby Intellectual Property Licensing, LLC	Expired

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602751-WO-2	Patent Cooperation Treaty	8/31/2021	PCT/US2021/048535	WO/2022/051302		DEVICES COMPATIBLE WITH NIGHT VISION EQUIPMENT	Dolby Intellectual Property Licensing, LLC	Expired
605665-US-1	United States of America	10/8/2021	63/254,021			URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
605665-WO-2	Patent Cooperation Treaty	4/13/2022	PCT/US2022/024577	WO/2022/221385		URANIUM-BASED PHOSPHORS AND COMPOSITIONS FOR DISPLAYS AND LIGHTING APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
607693-US-1	United States of America	5/5/2022	63/338,868			PRINTING, FILMS AND SUBSTRATES	Dolby Intellectual Property Licensing, LLC	Expired
RD27644-US-1	United States of America	11/1/1999	60/162901			ACTIVE VIRTUAL NETWORK MANAGEMENT PREDICTION	Dolby Intellectual Property Licensing, LLC	Expired
RD28356-EP-2	European Patent	2/26/2007	7751816.5	EP1999230	6/13/2012	RED EMITTING PHOSPHOR MATERIALS FOR USE IN LED AND LCD APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
RD28356-WO-7	Patent Cooperation Treaty	2/26/2007	PCT/US2007/005083			RED LINE EMITTING PHOSPHORS FOR USE IN LED APPLICATIONS	Dolby Intellectual Property Licensing, LLC	Expired
604111-US-1	United States of America	3/31/2022	63/325,736			SAFETY AND SECURITY OF CYBER-PHYSICAL SYSTEMS CONNECTED	Dolby Intellectual Property Licensing, LLC	Expired
604111-US-2	United States of America	3/24/2022	63/323,241			SAFETY AND SECURITY OF CYBER-PHYSICAL SYSTEMS CONNECTED THROUGH IOT NETWORK	Dolby Intellectual Property Licensing, LLC	Expired
508927-WO-2	Patent Cooperation Treaty	9/20/2022	PCT/US2022/076711	WO 2023/044499		Systems and Methods for Node Selection and Ranking in Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Expired
606915-US-1	United States of America	5/23/2022	63/344,711			Distributed Anomaly Detection and Localization for Cyber-Physical Systems	Dolby Intellectual Property Licensing, LLC	Expired
607309-US-1	United States of America	9/9/2022	63/375,205			System and Method for Power Grid Sensing	Dolby Intellectual Property Licensing, LLC	Expired
607309-US-3	United States of America	6/2/2023	63/506,031			System and Method for Power Grid Sensing	Dolby Intellectual Property Licensing, LLC	Expired
607309-US-4	United States of America	6/15/2023	63/508,357			System and Method for Power Grid Sensing	Dolby Intellectual Property Licensing, LLC	Expired
602905-WO-2	Patent Cooperation Treaty	8/19/2022	PCT/US2022/075196	WO/2023/023637		Systems and Methods for Cyber-Fault Detection	Dolby Intellectual Property Licensing, LLC	Expired
602922-WO-2	Patent Cooperation Treaty	8/19/2022	PCT/US2022/75198	WO2023023639		Systems and Methods for Self-Adapting Neutralization Against Cyber-Faults	Dolby Intellectual Property Licensing, LLC	Expired
246663-AU-2	Australia	6/25/2012	2012203684			ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
246663-BR-3	Brazil	6/26/2012	BR102012015 7942			ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246663-CA-4	Canada	6/21/2012	2780604			ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246663-DE-5	Germany (Federal Republic of)	6/21/2012	1.02012E+11	DE10201210 541		ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246663-GB-6	United Kingdom	6/21/2012	1210969	GB2492456		ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246663-JP-7	Japan	6/25/2012	2012-141562	JP20130130 75		ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246663-NZ-8	New Zealand	6/25/2012	600876	NZ600876	5/1/2014	ELECTRICAL SUBSTATION FAULT MONITORING AND DIAGNOSTICS	Dolby Intellectual Property Licensing, LLC	Expired
246941-US-1	United States of America	8/17/2010	61/374431			COMPACT LED LIGHT ENGINE WITH REFLECTOR CUPS AND HIGHLY DIRECTIONAL LAMPS USING SAME	Dolby Intellectual Property Licensing, LLC	Expired
246941-WO-3	Patent Cooperation Treaty	6/7/2011	US11/39392	WO12/24011		COMPACT LED LIGHT ENGINE WITH REFLECTOR CUPS AND HIGHLY DIRECTIONAL LAMPS USING SAME	Dolby Intellectual Property Licensing, LLC	Expired
307094-GB-1	United Kingdom	11/19/2009	920237.5	GB2475495	10/12/2011	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
307094-FR-2	France	11/15/2010	10014618.2	FR2325934	7/10/2013	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
307094-DE-3	Germany (Federal Republic of)	11/15/2010	10014618.2	DE60201000 8331.4	7/10/2013	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
307094-IT-4	Italy	11/15/2010	10014618.2	IT201390219 5315	7/10/2013	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC .	Expired
307094-CH-5	Switzerland	11/15/2010	10014618.2	CH2325934	7/10/2013	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
307094-EP-6	European Patent	11/15/2010	10014618.2	EP2325934	7/10/2013	FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
307094-US-8	United States of America	5/29/2015	14/725467	US20150263 363		FUEL CELL SYSTEM AND OPERATING METHOD	Dolby Intellectual Property Licensing, LLC	Expired
315132-US-1	United States of America	10/8/2007	60/978364			SYSTEM AND METHODS FOR AUTOMATED GRAMMAR BASED FAULT DISCOVERY AND ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
315132-US-2	United States of America	7/1/2008	61/077458			AUTOMATIC GRAMMAR BASED FAULT DETECTION AND ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
315132-WO-4	Patent Cooperation Treaty	10/8/2008	PCT/CA2008/ 001785	WO2009046 525		AUTOMATIC GRAMMAR BASED FAULT DETECTION AND ISOLATION	Dolby Intellectual Property Licensing, LLC	Expired
315166-US-1	United States of America	2/27/2008	61/032043			SYSTEM AND METHODS FOR AUTOMATED GRAMMAR BASED TEST PLANNING	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
315166-WO-3	Patent Cooperation Treaty	2/27/2009	PCT/CA2009/000232	WO2009105883		SYSTEM AND METHOD FOR GRAMMAR BASED TEST PLANNING	Dolby Intellectual Property Licensing, LLC	Expired
315170-US-1	United States of America	2/27/2008	61/032046			TEST BENCH FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315170-US-2	United States of America	7/1/2008	61/077459			TEST BENCH FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315170-WO-6	Patent Cooperation Treaty	2/27/2009	PCT/CA2009/000239	WO2009105889		TESTING FRAMEWORK FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315170-EP-7	European Patent	2/27/2009	9715372	EP2260385		TESTING FRAMEWORK FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315170-IN-8	India	2/27/2009	5424/CHENP/2010	IN50/2010		TESTING FRAMEWORK FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315170-US-9	United States of America	7/22/2016	15/217,832	US10592369	3/17/2020	TEST BENCH FOR CONTROL DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
610770-KR-1	Korea, Republic of (KR)	8/18/2014	10-2014-0106769	KR10-2016-0021491		Light emitting diode package	Dolby Intellectual Property Licensing, LLC	Expired
610772-WO-5	Patent Cooperation Treaty	1/13/2012	PCT/KR2012/000314	WO/2012/102501		Wafer level LED package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Expired
610772-EP-7	European Patent	1/13/2012	12739572.1	EP2669963	8/22/2018	Wafer level LED package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Expired
610772-JP-8	Japan	1/13/2012	2013-551891			Wafer level LED package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Expired
610772-EP-9	European Patent	1/13/2012	14150304.5	EP2720283	5/16/2018	Wafer level LED package and method of fabricating the same	Dolby Intellectual Property Licensing, LLC	Expired
610773-KR-7	Korea, Republic of (KR)	1/14/2010	10-2010-0003396	KR10-1623950	5/24/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Expired
610773-KR-8	Korea, Republic of (KR)	1/15/2010	10-2010-0003964	KR10-1625127	5/27/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Expired
610773-KR-9	Korea, Republic of (KR)	1/15/2010	10-2010-0003396	KR10-1625130	5/27/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Expired
610773-WO-20	Patent Cooperation Treaty	12/16/2010	PCT/KR2010/009008	WO/2011/083923		Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Expired
149581-US-1	United States of America	4/26/2004	10/831862	US7224000	5/29/2007	LIGHT EMITTING DIODE COMPONENT	Joint ownership - Dolby Intellectual Property Licensing, LLC with Current	Expired
149581-US-2	United States of America	12/20/2005	11/312268	US7800121	9/21/2010	LIGHT EMITTING DIODE COMPONENT	Joint ownership - Dolby Intellectual Property Licensing, LLC with Current	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
202972-US-1	United States of America	2/28/2006	11/364611	US7497973	3/3/2009	RED LINE EMITTING PHOSPHOR MATERIALS FOR USE IN LED APPLICATIONS	Joint ownership - Dolby Intellectual Property Licensing, LLC with Current	Expired
315172-US-1	United States of America	8/4/2011	13/198663	US9026394	5/5/2015	TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315172-US-2	United States of America	3/16/2012	13/423004	US9280434 B2	3/8/2016	TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315172-US-3	United States of America	3/7/2016	15/063174	US20160188 433A1		TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315172-WO-4	Patent Cooperation Treaty	8/3/2012	PCT/CA2012/ 000740	WO2013016 814		TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315172-EP-5	European Patent	8/3/2012	12819724.1	EP2740036	3/15/2017	TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
315172-IN-6	India	8/3/2012	1329/CHENP/ 2014			TESTING AND MITIGATION FRAMEWORK FOR NETWORKED DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
607692-US-1	United States of America	5/4/2022	63/338,428			Phosphors, Ink Formulations and FilmsPHOSPHORS, INK FORMULATIONS AND FILMS	Dolby Intellectual Property Licensing, LLC	Expired
GE24357DE01	DE	EP1518078 3	9/24/2003	EP2711233	11/6/2024	POWER SUPPLY MANAGEMENT APPARATUS AND METHOD THEREOF	Dolby Intellectual Property Licensing, LLC	Active
GE24817TW02	TW					DISPLAYS WITH EXPANDED GAMUT COVERAGE AND LOW BLUE LIGHT EMISSION	Dolby Intellectual Property Licensing, LLC	Not Yet Filed
GE24883TW01	TW					Remote Phosphor films in reflective geometry	Dolby Intellectual Property Licensing, LLC	Not Yet Filed
GE24883WO01	PCT					Remote Phosphor films in reflective geometry	Dolby Intellectual Property Licensing, LLC	Not Yet Filed

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	273252-US-8
	Application Number	15/799,045
Title of Invention	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	~~General Electric Company~~ EDISON INNOVATIONS, LLC		
Mailing Address Information For Applicant:			
Address 1	~~1 River Road~~ 812 W. McDermott Dr. #1106		
Address 2			
City	~~Schenectady~~ Allen	**State/Province**	~~NY~~ TX
Country	US	Postal Code	~~12345~~ 75013
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	273252-US-8
	Application Number	15/799,045
Title of Invention	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	~~General Electric Company~~ EDISON INNOVATIONS, LLC

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	~~1 River Road~~ 812 W. McDermott Dr. #1106		
Address 2			
City	~~Schenectady~~ Allen	**State/Province**	~~NY~~ TX
Country	US	Postal Code	~~12345~~ 75013
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Tarek N. Fahmi/			Date (YYYY-MM-DD)	2025-04-22
First Name	Tarek	Last Name	Fahmi	Registration Number	41402

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UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
15/799,045	**04/22/2025 05:59:05 PM Z ET**	**273252-US-8**

Title of Invention

VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	10442296
CONFIRMATION #	9433	FILED BY	SARAH ZIZZO
PATENT CENTER #	70115978	FILING DATE	10/31/2017
CUSTOMER #	131278	FIRST NAMED INVENTOR	Robert Dean King
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Tarek Fahmi

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Edison_Exe_POA.pdf	134	Power of Attorney	1351 KB
15799045_Statement_3-73c.pdf	3	Assignee showing of ownership per 37 CFR 3.73	120 KB
15799045_ADS_GE_both.pdf	2	Application Data Sheet	148 KB

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Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

Edison_Exe_POA.pdf	70037A4FECD2A63822F4A656346D25696299CADFD63189BBD FE124E26BB75CEEB71D3AB5B008D49AAB79E187DD66B1BB FCBCDA44980A8741C98797B48E0C70E6
15799045_Statement_3-73c.pdf	9B67EB6C9935292C59B715D9DE773D494FE57C43481B7FAB3 950017C80F0F95316BB615DFD3F36C9E0D0BD44FCD69F66C D1A821EBFF1F1FBD66EFCD11F2A69C4
15799045_ADS_GE_both.pdf	A874EA109D5351913937CA4E3E58648E4C9AD561EE542E8B1 E7C1D99CCED6D8FE175E112A3B863A9EC8C65D49C19E1697 2C89BB5AB12EAD1764CDF8A139F4209

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: EDISON INNOVATIONS, LLC

Application No./Patent No.: 10,439,456 Filed/Issue Date: 10/08/2019

Titled: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

EDISON INNOVATIONS, LLC, a company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: KING, ROBERT DEAN; et al. To: GENERAL ELECTRIC COMPANY

      The document was recorded in the United States Patent and Trademark Office at

      Reel 045520, Frame 0854, or for which a copy thereof is attached.

   2. From: GENERAL ELECTRIC COMPANY To: GE INTELLECTUAL PROPERTY LICENSING, LLC

      The document was recorded in the United States Patent and Trademark Office at

      Reel 070636, Frame 0815, or for which a copy thereof is attached.

This collectionof information is required by 37CFR 3.73(b). The informationis required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application.Confidentiality isgoverned by 35U.S.C. 122 and37 CFR 1.11and 1.14.This collection is estimated to take 12 minutes to complete, including gathering,preparing, and submitting the completed applicationform to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should besent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETEDFORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA22313-1450** .

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3. From: GE INTELLECTUAL PROPERTY LICENSING, LLC To: DOLBY INTELLECTUAL PROPERTY LICENSING, LLC

The document was recorded in the United States Patent and Trademark Office at
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4. From: DOLBY INTELLECTUAL PROPERTY LICENSING, LLC To: EDISON INNOVATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 070293, Frame 0273, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
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6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Tarek N. Fahmi/	2025-04-22
Signature	Date
Tarek N. Fahmi	41402
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requiresthat you begiven certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirementsof the Act, please be advised that: (1)the general authority for the collectionof this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary;and (3) the principalpurpose for whichthe informationis used by the U.S. Patent and Trademark Office is to process and/or examine your submission related toa patent application or patent. If you do not furnishthe requested information, the U.S. Patent and Trademark Officemay not be able to process and/or examine yoursubmission, which may result in termination of proceedings orabandonment of the application or expiration of the patent.

Theinformation provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need forthe information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. Arecord related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further,a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. Arecord from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/15/2019	10442296	273252-US-8	9433

131278 7590 09/25/2019

Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Robert Dean King, Schenectady, NY;
General Electric Company, Schenectady, NY;
Zhihao Li, Rexford, NY;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15779045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8387730	B2	2013-03-05	Bouchon	
	2	9561719	B2	2017-02-07	Lo et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030150352	A1	2003-08-14	Kumar	
	2	20040069548	A1	2004-04-15	Kira et al.	
	3	20060169548	A1	2006-08-03	Corbett et al.	
	4	20100219794	A1	~~3028-09-02~~ 09/2010	Sugimoto et al.	

Change(s) applied to document.
/J.M./
5/3/2019

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

031278 7590 06/05/2019
Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

EFS WEB	(Typed or printed name)
	(Signature)
	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-US-8	9433

TITLE OF INVENTION: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	09/05/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
GLASS, ERICK DAVID	2837	318-139000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Meagher Emanuel Laks
2 Goldberg & Liao, LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: GENERAL ELECTRIC COMPANY

(B) RESIDENCE: (CITY and STATE OR COUNTRY): SCHENECTADY, NEW YORK

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 505522

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Craig M. Drachtman/ Date 2019-08-30

Typed or printed name CRAIG M. DRACHTMAN Registration No. 73016

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 146 of 798

Electronic Patent Application Fee Transmittal

Application Number:	15799045
Filing Date:	31-Oct-2017
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Filer:	Craig Michael Drachtman/Silvia Mannes
Attorney Docket Number:	273252-US-8

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	1000

Electronic Acknowledgement Receipt	
EFS ID:	37027648
Application Number:	15799045
International Application Number:	
Confirmation Number:	9433
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Customer Number:	131278
Filer:	Craig Michael Drachtman/Silvia Mannes
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	273252-US-8
Receipt Date:	30-AUG-2019
Filing Date:	31-OCT-2017
Time Stamp:	10:13:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1000
RAM confirmation Number	E20198TA13564401
Deposit Account	505522
Authorized User	Silvia Mannes
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	273252-US-8-IssueFee-30AUG19.pdf	1638267 3dea4ea789358a0a3157f408d951ce51f938f33f	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30591 b16663561850e02ac71a5a3e429ac9d81b5cdb8d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1668858		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-US-8	9433

131278 7590 07/10/2019

Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

EXAMINER	
GLASS, ERICK DAVID	

ART UNIT	PAPER NUMBER
2837	

NOTIFICATION DATE	DELIVERY MODE
07/10/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gedocket@meagheremanuel.com

Corrected ***Notice of Allowability***	**Application No.** 15/799,045	**Applicant(s)** King et al.	
	Examiner ERICK D GLASS	**Art Unit** 2837	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 7/2/19.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-5,7-16 and 18-22 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 7/2/19.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ERICK D GLASS/
Primary Examiner, Art Unit 2837

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/E.G./	1	7063637	B2	2006-06-20	Yanauchi et al.	
/E.G./	2	7207915	B2	2007-04-24	Oshidari et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/E.G./	1	2006-042510	JP	B	2006-02-09	Nissan Motor	With English Abstract	

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ERICK D GLASS/	Date Considered	07/06/2019

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-07-02
Name/Print	Craig M. Drachtman	Registration Number	73,016

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7063637	B2	2006-06-20	Yanauchi et al.	
	2	7207915	B2	2007-04-24	Oshidari et al.	

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	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

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	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-07-02
Name/Print	Craig M. Drachtman	Registration Number	73,016

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Bibliographic data: JP2006042510 (A) — 2006-02-09

HYBRID TRANSMISSION

Inventor(s): YAMAUCHI YASUHIRO ± (YAMAUCHI YASUHIRO)

Applicant(s): NISSAN MOTOR ± (NISSAN MOTOR CO LTD)

Classification: - **international:** ***B60K6/445; B60K6/543; B60L11/14; B60L50/16; B60W10/02; B60W10/06; B60W10/08; B60W20/00***
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Application number: JP20040219657 20040728 Global Dossier

Priority number (s): JP20040219657 20040728

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Abstract of JP2006042510 (A)

PROBLEM TO BE SOLVED: To prevent motor-generators from being rotated at over speed during deceleration in a state in which an engine clutch is disengaged and control on the motor-generators is stopped. ;SOLUTION: In cases where deceleration in a state in which the engine clutch E/C is disengaged and control on the motor-generators MG1 and MG2 is stopped is natural deceleration independent of braking operation, the lever in the alignment chart is rotated in the direction shown by arrow with point D in output Out greatest in inertia at the center from the state indicated by broken line to the state indicated by solid line because of friction torque balance. MG1 is lowered in number of revolutions as shown by X1, and MG2 is increased in number of revolutions as shown by X2. Thus, torque balance is obtained with the number of MG2 revolutions higher than the number of MG1 revolutions. Therefore, the friction torque while control on MG1 and MG2 is stopped is determined so that the number of revolutions of MG2 whose number of revolutions is increased unlike MG1 becomes equivalent to a change gear ratio at which the allowable number of revolutions at point E will not be exceeded. That is, the friction torque is determined so that torque balance will be obtained and rotation be stopped before the lever in the alignment charge is brought into the state shown by solid line. ;COPYRIGHT: (C)2006,JPO&NCIPI

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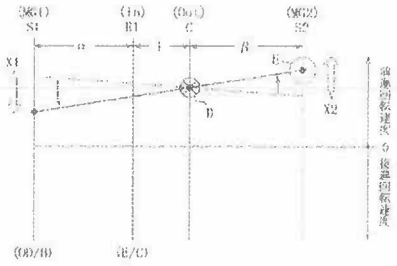
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最終頁に続く

(54)【発明の名称】ハイブリッド変速機

(57)【要約】
【課題】エンジンクラッチを解放すると共に両モータ／ジェネレータの制御を停止した状態での減速時にモータ／ジェネレータが過回転することのないようにする。
【解決手段】エンジンクラッチE/Cを解放すると共にモータ／ジェネレータMG1,MG2の制御を停止した状態での減速が、制動操作に依らない自然減速である場合、共線図上のレバーが、イナーシャの最も大きな出力Dnにおける D点を中心として、フリクショントルクバランスの関係で破線図示の状態から矢印で示す方向へ実線図示の状態へと回動し、MG1がX1で示すように回転数を低下され、MG2がX2で示すように回転数を上昇されることから、MG2の回転数がMG1の回転数よりも高い状態でトルクバランスする。よって、MG1,MG2のうち、回転数が上昇する方のMG2の回転数が、E点における許容回転数を超えることのない変速比となるよう、つまり、共線図上のレバーが実線状態となるよりも前にトルクバランスして回動を停止するよう、MG1,MG2の制御停止状態でのフリクショントルクを定める。
【選択図】図３



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【特許請求の範囲】
【請求項1】
エンジンと、出力軸と、２個のモータ／ジェネレータとの間を差動装置により相互に連結して該モータ／ジェネレータの制御により変速可能に構成され、前記差動装置を構成する回転要素のうち、前記エンジンに係わる回転要素、およびエンジン間にエンジンクラッチを介在させたハイブリッド変速機において、
前記エンジンクラッチを解放すると共に前記両モータ／ジェネレータの制御を停止した状態での減速時に、これらモータ／ジェネレータの回転数が許容回転数を越えることのないよう、これらモータ／ジェネレータの制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成したことを特徴とするハイブリッド変速機。
【請求項2】
請求項１に記載のハイブリッド変速機において、
前記エンジンクラッチを解放すると共に前記両モータ／ジェネレータの制御を停止した状態での前記減速時に回転数が高くなる方のモータ／ジェネレータの回転数が許容回転数を超えることのない変速比となるよう、これらモータ／ジェネレータの制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成したことを特徴とするハイブリッド変速機。
【請求項3】
請求項２に記載のハイブリッド変速機において、
前記エンジンクラッチを解放すると共に前記両モータ／ジェネレータの制御を停止した状態での前記減速が、制動操作に依らない自然減速である場合、回転数が上昇する方のモータ／ジェネレータの回転数が許容回転数を超えることのない変速比となるよう、これらモータ／ジェネレータの制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成したことを特徴とするハイブリッド変速機。
【請求項4】
請求項２または３に記載のハイブリッド変速機において、
前記エンジンクラッチを解放すると共に前記両モータ／ジェネレータの制御を停止した状態での前記減速が、制動操作に依る制動減速である場合、イナーシャが小さい方のモータ／ジェネレータの回転数が許容回転数を超えることのない変速比となるよう、これらモータ／ジェネレータの制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成したことを特徴とするハイブリッド変速機。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は、２個のモータ／ジェネレータの制御により無段変速が可能なハイブリッド変速機に関し、特に、エンジンクラッチの解放でエンジンが切り離され、且つ、両モータ／ジェネレータの制御が停止された状態での減速時において、モータ／ジェネレータが過回転を生ずることのないよう構成したハイブリッド変速機に関するものである。
【背景技術】
【0002】
ハイブリッド変速機は、エンジンと、出力軸と、モータ／ジェネレータとの間を差動装置により相互に連結して構成され、車両を、モータ／ジェネレータからの動力のみにより電気走行させたり、エンジン動力および上記モータ／ジェネレータからの動力によりハイブリッド走行させることができ、何れの走行形態においてもモータ/ジェネレータの制御により無段変速を行わせることができる。
【0003】
かようにモータ/ジェネレータの制御により変速比を作り出すハイブリッド変速機の変速制御装置にあっては従来、例えば特許文献１に記載のように、ハイブリッド走行中エンジン回転数が例えば最適燃費を実現する値に保たれるようハイブリッド変速機を変速制御するのが一般的である。

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また減速に際しては、要求駆動力や車速といった走行状態に応じて目標変速比を決定し、実変速比がこれに追従するようハイブリッド変速機を変速制御しながら減速を行わせる。

【特許文献1】特開２００３－０３４１５４号公報

【発明の開示】

【発明が解決しようとする課題】

【0004】

ところでハイブリッド変速機は、前記差動装置を構成する回転要素のうち、エンジンに係わる回転要素とエンジンとを常時結合したままであると、電気走行中において、エンジンを用いないにもかかわらず、エンジンを引きずって走行することになるため、エネルギー損失が大きくなる。

そこで、エンジンに係わる回転要素とエンジンとの間にエンジンクラッチを介在させ、これらの間を適宜切り離し得るようにするのが一般的である。

【0005】

一方で、急減速などのため上記モータ／ジェネレータの制御を停止させた状態で減速を行う必要が生じた場合、エンジンクラッチを締結させたままだと、ハイブリッド変速機を表す共線図上でのレバーのバランスによりモータ／ジェネレータの回転数が決まることから、そしてこの時、共線図上のレバーがイナーシャの大きなエンジン軸を中心として回動することから、モータ／ジェネレータの回転数が極めて高くなり、モータ／ジェネレータが過回転して耐久性を損なわれたり、運転者に違和感を与えるという問題がある。

【0006】

そのため、モータ／ジェネレータの制御を停止させた状態で減速を行う場合は、エンジンクラッチを解放させてエンジンをハイブリッド変速機から切り離すことになる。

しかし、かようにモータ／ジェネレータの制御を停止させると共にエンジンクラッチを解放させた状態で減速を行うと、今度は、ハイブリッド変速機を表す共線図上のレバーが、制動操作に依らない自然減速時はイナーシャの最も大きな出力軸を中心として回動し、制動操作に依る制動減速時は、モータ／ジェネレータのうちイナーシャの大きい方のモータ／ジェネレータを中心として回動し、この場合もモータ／ジェネレータの過回転に関する問題を生ずる。

【0007】

かといって、上記の減速時にモータ／ジェネレータが過回転しないようハイブリッド変速機の変速比を固定しようとすると、これによる回転数維持で出力回転数の低下、つまり減速度が、制動操作により期待した通りに得られず、減速不足を運転者が感じるようになって、運転性の低下を招く。

ちなみに、この時エンジンクラッチを締結したままだと、エンジン回転数を維持するために、ハイ側への変速が行われる可能性があり、この変速によっても運転者が減速不足を感じるようになる。

【0008】

本発明は、上記の実情に鑑み、変速比を固定するなどの制御による対策に代え、エンジンクラッチを解放すると共に両モータ／ジェネレータの制御を停止した状態での減速でも、モータ／ジェネレータが過回転することのないようなハイブリッド変速機の構成として、モータ／ジェネレータの過回転に関する前記の問題を解消することを目的とする。

【課題を解決するための手段】

【0009】

この目的のため、本発明によるハイブリッド変速機は、請求項１に記載した以下のごときものとする。

先ず前提となるハイブリッド変速機は、エンジンと、出力軸と、２個のモータ／ジェネレータとの間を差動装置により相互に連結して該モータ／ジェネレータの制御により変速可能に構成され、上記差動装置を構成する回転要素のうち、エンジンに係わる回転要素、およびエンジン間にエンジンクラッチを介在させたものである。

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【0010】
本発明においては、かかるハイブリッド変速機に対し以下の構成を付加する。
つまり、上記エンジンクラッチを解放すると共に上記両モータ／ジェネレータの制御を停止した状態での減速時に、これらモータ／ジェネレータの回転数が許容回転数を越えることのないよう、これらモータ／ジェネレータの制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成した点に特徴づけられる。
【発明の効果】
【0011】
かかる本発明のハイブリッド変速機によれば、両モータ／ジェネレータを、これらモータ／ジェネレータの制御停止状態でのフリクショントルクが上記のものとなるよう構成したため、
上記の減速時でも、モータ／ジェネレータの回転数が許容回転数を越えることがなくなり、モータ／ジェネレータの過回転を防止してその耐久性が損なわれたり、運転者に違和感を与えるという問題を回避することができる。
【発明を実施するための最良の形態】
【0012】
以下、本発明の実施の形態を、図面に示す実施例に基づき詳細に説明する。
図１は、本発明の一実施例になるハイブリッド変速機１を搭載する車両の駆動系を示す。
車両の駆動系は、ハイブリッド変速機１と、その入力側におけるエンジン２と、これら両者間に介在させたエンジンクラッチE/Cと、ハイブリッド変速機１の出力側におけるディファレンシャルギヤ装置３と、ハイブリッド変速機１からの出力をディファレンシャルギヤ装置３により分配されて伝達される左右駆動輪４Ｌ，４Ｒとで構成する。
【0013】
ハイブリッド変速機１は、フロントエンジン・フロントホイール駆動車（FF車）用のトランスアクスルとして用いるのに有用な、図１に示すごとき以下の構成となし、ディファレンシャルギヤ装置３を内包するものとする。
ハイブリッド変速機１を図１に基づき詳述するに、これは、軸線方向（図の左右方向）に２個の単純遊星歯車組２１、２２を同軸に配して具える。
エンジン２に近い側における遊星歯車組２１を、リングギヤＲ１、サンギヤＳ１、および、これらギヤに噛合させたピニオンＰ１により構成し、
エンジン２から遠い側における遊星歯車組２２を、リングギヤＲ２、サンギヤＳ２、および、これらギヤに噛合させたピニオンＰ２により構成する。
【0014】
ここで遊星歯車組２１のピニオンＰ１は、遊星歯車組２２まで延在する小径のロングピニオンとし、遊星歯車組２２のピニオンＰ２を大径のショートピニオンとし、小径のロングＰ１を大径のショートピニオンＰ２にも噛合させ、
これらピニオンＰ１，Ｐ２を共通なキャリアCに回転自在に支持して、遊星歯車組２１、２２がラビニョオ型プラネタリギヤセットを構成するようになす。
このラビニョオ型プラネタリギヤセットが本発明における差動装置に相当する。
【0015】
このラビニョオ型プラネタリギヤセットを挟んでエンジン２から遠い側に複合電流２層モータ２３を設け、これを、上記のラビニョオ型プラネタリギヤセットと共に変速機ケース２４内に収納する。
複合電流２層モータ２３は、内側ロータ23riと、これを包囲する環状の外側ロータ23roとを、変速機ケース２４内に同軸に回転自在に支持して具え、これら内側ロータ23riおよび外側ロータ23ro間における環状空間に同軸に配置した環状ステータ23ｓを変速機ケース１に固設して構成する。
【0016】
複合電流２層モータ２３は、外側ロータ23roおよび環状ステータ23ｓで第１のモータ／

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ジェネレータMG1を構成し、環状ステータ23sおよび内側ロータ23riで第２のモータ／ジェネレータMG2を構成する。

第１のモータ／ジェネレータMG1（外側ロータ23ro）を、上記ラビニョオ型プラネタリギヤセットにおけるサンギヤＳ１に結合し、第２のモータ／ジェネレータMG2（内側ロータ23ri）を、上記ラビニョオ型プラネタリギヤセットにおけるサンギヤＳ２に結合する。

【0017】

また、上記ラビニョオ型プラネタリギヤセットにおけるリングギヤＲ２を、ローブレーキL/Bにより適宜固定可能とし、サンギヤＳ２を、オーバードライブブレーキOD/Bにより適宜固定可能とする。

そしてリングギヤＲ１は入力要素とし、エンジンクラッチE/Cを介してエンジン２に結合可能とする。

更にキャリアCは出力要素とし、これに出力歯車２５を同軸一体に結合して出力軸となし、出力歯車２５にカウンターギヤ２６を噛合させる。

カウンターギヤ２６はカウンターシャフト２７に結合して設け、このカウンターシャフト２７には更にファイナルドライブピニオン２８を結合して設ける。

そしてファイナルドライブピニオン２８を、ディファレンシャルギヤ装置３に結合されたファイナルドライブリングギヤ２９に噛合させる。

【0018】

図１につき上述したハイブリッド変速機１は図２の共線図により表され、この共線図においてInは、エンジン２からの入力を示し、またOutは、車輪４Ｌ，４Ｒへの出力を示し、α，β，γはそれぞれ、遊星歯車組２１，２２の歯数比で決まる回転要素間の距離の比を意味する。

図２にレバーLBで示すように、ローブレーキL/Bを締結させてリングギヤＲ２を回転数0に固定した変速（LB）モードでは、共線図上のレバーLBがAを支点として回動するため変速比固定モードとなり、そのレバー比でエンジン２（入力In）からのトルクおよびモータ／ジェネレータMG1,MG2からのトルクがそれぞれ増大されて出力Outに至るため、ローブレーキL/Bを解放している場合よりも大きな駆動力を車輪４Ｌ，４Ｒに向かわせることができる。

従って、この変速比固定のLBモードは大きな駆動力が要求される車両の発進時に用いる。

【0019】

車輪４Ｌ，４Ｒに大きな駆動力が必要でなくなった中速走行時は、図２にレバーを示さなかったが、ローブレーキL/Bを解放させてリングギヤＲ２を自由に回転し得るようにする。

この時、オーバードライブブレーキOD/Bの解放と相まって、モータ／ジェネレータMG1,MG2の制御により無段変速が可能である。

なお、ローブレーキL/Bを締結させた変速比固定モードから当該無段変速モードへの切り替えに当たっては、モータ／ジェネレータMG1,MG2の適切な出力トルク制御により当該モード切り替え時における出力トルク変化を滑らかなものにし、モード切り替えショックを緩和することができる。

【0020】

ちなみに、かかる無段変速モードにおいて、モータ／ジェネレータMG1,MG2およびエンジン２の回転速度限界により決まる高速側限界の変速状態は、図２にレバーMAXで示すごときものとなる。

ところで無段変速モードにおいては、第１モータ／ジェネレータMG1が後進回転している場合、この第１モータ／ジェネレータMG1で発電して得られた電力で第２モータ／ジェネレータMG2を駆動し、第１モータ／ジェネレータMG1が前進回転している場合、第２モータ／ジェネレータMG2で発電して得られた電力で第１モータ／ジェネレータMG1を駆動というように、電力収支が釣り合ってバッテリ持ち出し電力の少ない、若しくは０の状態での走行が可能である。

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また必要であれば、発電中のモータ／ジェネレータを駆動出力が増大するよう制御したり、両モータ／ジェネレータMG1,MG2を共に駆動状態となるよう制御することにより、エンジン出力以上の大きなパワーで車両を走行させることもできる。

【0021】

無段変速モードにおいては更に、モータ／ジェネレータMG1またはMG2の回転数が０となる時の入出力回転数比（変速比）が２種類存在し、これら変速比のもとでは電気的な動力を伝達することなく車両を走行させ得る。

またこれら変速比のもとでは、機械的な伝動効率よりも効率の低い電気的な伝動の割合を低いことから、ハイブリッド変速機の伝動効率を高めることができる。

【0022】

車輪４Ｌ，４Ｒを更に高速回転で駆動することが要求される高速走行時は、図２にレバーODで示すように、オーバードライブブレーキOD/Ｂを締結させてサンギヤＳ１を回転数０に固定する。

このとき共線図上のレバーODがＢを支点として回動するため、この場合も変速比固定モードとなるが、ここではそのレバー比でエンジン２（入力In）の回転が増速されて出力Outに至るため、オーバードライブブレーキOD/Ｂを解放している場合よりも高速回転を車輪４Ｌ，４Ｒに伝わせることができる。

従って、この変速比固定のODモードは出力Outの高速回転が要求される車両の高速走行時に用いる。

【0023】

上記はいずれも、エンジン動力とモータ／ジェネレータ動力との双方を用いたハイブリッド走行時の変速状態であるが、モータ／ジェネレータMG1,MG2のみにより車両を電気（EV）走行させるには、図２にレバーEVで示すごとく、エンジンに結合したリングギヤＲ１の回転数が０に保たれるようにしつつモータ／ジェネレータMG1を逆回転駆動させると共にモータ／ジェネレータMG2を正回転駆動させることで、モータ／ジェネレータMG1,MG2のみを動力源として出力Outから正回転を取り出すようになす。

そして電気走行中の変速制御に当たっては、モータ／ジェネレータMG1の逆回転速度およびモータ／ジェネレータMG2の正回転速度を制御することにより要求される変速を遂行することができる。

なお電気走行中に上記のごとく、エンジンに結合したリングギヤＲ１の回転数を０に保つ場合、エンジンクラッチE/Cの解放は必ずしも必要ではないが、本実施例では電気走行中にエンジンクラッチE/Cを解放するものとする。

【0024】

車両を後退走行させるに際しては、図２にレバーREVで示すように、エンジンに結合したリングギヤＲ１の回転数が０に保たれるようにしつつモータ／ジェネレータMG1を正回転駆動させると共にモータ／ジェネレータMG2を逆回転駆動させることで、モータ／ジェネレータMG1,MG2のみを動力源として出力Outから逆回転を取り出すようになす。

【0025】

上記のようなハイブリッド変速機１においては、急減速などのためモータ／ジェネレータMG1,MG2の上記制御を停止させた状態で車両の減速を行う必要が生じた場合、エンジンクラッチE/Cを締結させたままだと、図２に示す共線図上でのレバーのバランスによりモータ／ジェネレータMG1,MG2の回転数が決まることから、そしてこの時、共線図上においてレバーが、イナーシャの大きなエンジンからの入力Inを中心として回動することから、モータ／ジェネレータMG1,MG2が高くなり、モータ／ジェネレータが過回転して耐久性を損なわれたり、運転者に違和感を与えるという問題がある。

【0026】

そのため、モータ／ジェネレータMG1,MG2の制御を停止させた状態で減速を行う場合は、エンジンクラッチE/Cを解放させてエンジン２をハイブリッド変速機１から切り離すことになる。

しかし、かようにモータ／ジェネレータMG1,MG2の制御を停止させると共にエンジンク

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クラッチE/Cを解放させた状態で減速を行うと、今度は、図2に示す共線図上においてレバーが、制動操作に依らない自然減速時は図3に矢印で示すように、イナーシャの最も大きな車輪駆動系への出力Outを中心として回動し、制動操作に依る制動減速時は図4に矢印で示すように、モータ／ジェネレータMG1,MG2のうちイナーシャの大きい方のモータ／ジェネレータ（本実施例では、MG2とする）を中心として回動し、この場合もモータ／ジェネレータMG1,MG2の過回転に関する問題を生ずる。

【0027】

かといって、上記の減速時にモータ／ジェネレータMG1,MG2が過回転しないようハイブリッド変速機の変速比を固定しようとすると、これによる回転数維持で出力回転数の低下、つまり減速度が、制動操作により期待した通りに得られず、減速不足を運転者が感じるようになって、運転性の低下を招く。

ちなみに、この時エンジンクラッチE/Cを締結したままだと、エンジン回転数を維持するために、ハイ側への変速が行われる可能性があり、この変速によっても運転者が減速不足を感じるようになる。

【0028】

そこで本実施例においては、上記のような、変速比を固定するなどの制御による対策に代え、エンジンクラッチE/Cを解放すると共に両モータ／ジェネレータMG1,MG2の制御を停止した状態での減速でも、モータ／ジェネレータMG1,MG2が過回転することのないようハイブリッド変速機1を以下の構成とする。

【0029】

先ず、エンジンクラッチE/Cを解放すると共に両モータ／ジェネレータMG1,MG2の制御を停止した状態での減速が、制動操作に依らない自然減速である場合を考察する。

この場合は、共線図上のレバーが図3に示すように、イナーシャの最も大きな車輪駆動系への出力Outにおけるo点を中心として、共線図上のフリクショントルクバランスの関係で例えば破線図示の状態から矢印で示す方向へ実線図示の状態へと回動し、モータ／ジェネレータMG1がN1で示すように回転数を低下され、モータ／ジェネレータMG2がN2で示すように回転数を上昇されることから、モータ／ジェネレータMG2の回転数がモータ／ジェネレータMG1の回転数よりも高い状態でトルクバランスする。

【0030】

このため、かかる自然減速時はモータ／ジェネレータMG1,MG2のうち、回転数が上昇する方のモータ／ジェネレータMG2の回転数が、図3のE点における許容回転数を超えることのない変速比となるよう、つまり、共線図上のレバーが図3に実線で示す状態となるよりも前にトルクバランスして回動を停止するよう、モータ／ジェネレータMG1,MG2の制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成する。

【0031】

ここで、図3のD点周りにおけるレバーのトルクバランスを考察するに、モータ／ジェネレータMG1,MG2の発生トルクをそれぞれT1,T2とすると、

$(\alpha+1)\,T1=\beta\cdot T2$

が成立し、

また、モータ／ジェネレータMG1,MG2の制御停止状態でのフリクショントルクをそれぞれT1r,T2rとすると、

$(\alpha+1)\,T1r=\beta\cdot T2r$

が成立し、

更に、モータ／ジェネレータMG1,MG2のフリクショントルク調整量をそれぞれTft1,Tft2とすると、

$(\alpha+1)\,(T1r+Tft1)=\beta\cdot(T2r+Tft2)$

が成立する。

【0032】

よって、モータ／ジェネレータMG1,MG2のフリクショントルク調整量Tft1,Tft2を、上記の釣いが達成されるよう決定することで、所期の目的を達成することができる。

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なおモータ／ジェネレータMG1,MG2のフリクショントルク調整量Tft1,Tft2を実現するには、モータ／ジェネレータMG1,MG2内における軸受などの回転部分の動摩擦係数を材質変更や構造変更などにより調整したり、コギングトルクを変更するなど、様々な手法を用いることができる。

【0033】

次いで、エンジンクラッチE/Cを解放すると共に両モータ／ジェネレータMG1,MG2の制御を停止した状態での減速が、制動操作に依る制動減速である場合を考察する。

この場合は、共線図上のレバーが図４に示すように、制動操作に依る出力Outの矢印Y2で示す回転数低下により、イナーシャの大きい方のモータ／ジェネレータMG2における F点を中心として、例えば破線図示の状態から矢印で示す方向へ実線図示の状態へと回動し、出力Outの０への回転数低下につれ共線図上のフリクショントルクバランスの関係でモータ／ジェネレータMG1がY1で示すように回転数を一旦０にされた後、後進回転数を上昇されることから、モータ／ジェネレータMG1の回転数がモータ／ジェネレータMG2の回転数よりも高い状態でトルクバランスする。

【0034】

このため、かかる制動減速時は、制動操作に依り出力Outの回転数が０になった状態で、モータ／ジェネレータMG1,MG2のうち、イナーシャの小さい方のモータ／ジェネレータMG1の回転数が、図４のG点における許容回転数を超えることのない変速比となるよう、つまり、共線図上のレバーが図４に実線で示す状態となるよりも前にトルクバランスして回動を停止するよう、モータ／ジェネレータMG1,MG2の制御停止状態でのフリクショントルクを定めて両モータ／ジェネレータを構成する。

【0035】

ここで、図４の出力Out周りにおけるレバーのトルクバランスを考察するに、モータ／ジェネレータMG1,MG2の発生トルクをそれぞれT1,T2とすると、

$(\alpha+1)\,T1=\beta\cdot T2$

が成立し、

また、モータ／ジェネレータMG1,MG2の制御停止状態でのフリクショントルクをそれぞれT1r,T2rとすると、

$(\alpha+1)\,T1r=\beta\cdot T2r$

が成立し、

更に、モータ／ジェネレータMG1,MG2のフリクショントルク調整量をそれぞれTft1,Tft2とすると、

$(\alpha+1)\,(T1r+Tft1)=\beta\cdot(T2r-Tft2)$

が成立する。

【0036】

よって、モータ／ジェネレータMG1,MG2のフリクショントルク調整量Tft1,Tft2を、上記の狙いが達成されるよう決定することで、所期の目的を達成することができる。

なおモータ／ジェネレータMG1,MG2のフリクショントルク調整量Tft1,Tft2を実現するには、モータ／ジェネレータMG1,MG2内における軸受などの回転部分の動摩擦係数を材質変更や構造変更などにより調整したり、コギングトルクを変更するなど、様々な手法を用いることができる。

【0037】

以上の構成とした本実施例になるハイブリッド変速機によれば、エンジンクラッチE/Cを解放すると共に両モータ／ジェネレータMG1,MG2の制御を停止した状態での減速時に、回転数が高くなる方のモータ／ジェネレータの回転数が許容回転数を超えることのない変速比となるよう、これらモータ／ジェネレータMG1,MG2の制御停止状態でのフリクショントルクを定めたから、

前記のような自然減速時や制動減速時でも、モータ／ジェネレータMG1,MG2の回転数が許容回転数を越えることがなくなり、モータ／ジェネレータの過回転を防止してその耐久性が損なわれたり、運転者に違和感を与えるという問題を回避することができる。

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【図面の簡単な説明】

【0038】

【図1】本発明の一実施例になるハイブリッド変速機を示す線図的な縦断側面図である。

【図2】図１に示すハイブリッド変速機の共線図である。

【図3】図１に示すハイブリッド変速機を搭載した車両を、制動操作なしに自然減速させる時における、ハイブリッド変速機の動作説明に用いた、図２と同様な共線図である。

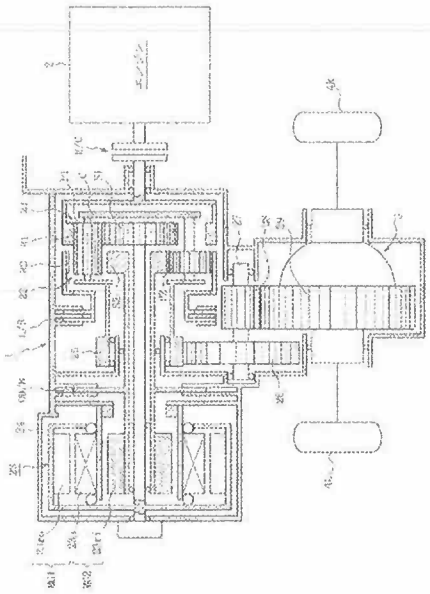
【図4】図１に示すハイブリッド変速機を搭載した車両を、制動操作に依り制動減速させる時における、ハイブリッド変速機の動作説明に用いた、図２と同様な共線図である。

【符号の説明】

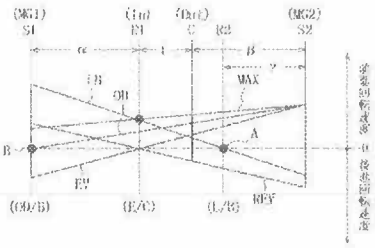
【0039】

1　ハイブリッド変速機
2　エンジン
E/C　エンジンクラッチ
3　ディファレンシャルギヤ装置
4L　左駆動輪
4R　右駆動輪
21　単純遊星歯車組（差動装置）
22　単純遊星歯車組（差動装置）
25　出力歯車
27　カウンターシャフト
MG1,MG2　モータ／ジェネレータ

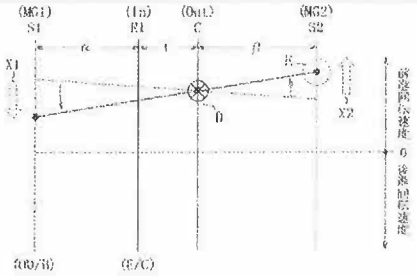
【図1】



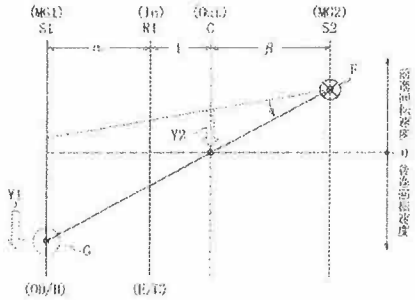
【図2】



【図3】



【図4】



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(51)Int.Cl.　　F I　　テーマコード（参考）
Ｂ６０Ｋ　6/04　(2006.01)　　Ｂ６０Ｋ　6/04　５５３
Ｂ６０Ｋ　6/04　７３１

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Ｆターム(参考) 5H115 PA01 PA12 PG06 PG04 PI16 PI24 PI29 PU02 PU06 PU17
PU08 PU24 PU28 QE10 RB08 RB21 SE04 SE08 SE09

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Electronic Patent Application Fee Transmittal	
Application Number:	15799045
Filing Date:	31-Oct-2017
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Filer:	Craig Michael Drachtman/Colleen Maroney
Attorney Docket Number:	273252-US-8
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
		Total in USD ($)		**240**

Electronic Acknowledgement Receipt	
EFS ID:	36477589
Application Number:	15799045
International Application Number:	
Confirmation Number:	9433
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	273252-US-8
Receipt Date:	02-JUL-2019
Filing Date:	31-OCT-2017
Time Stamp:	13:49:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$240
RAM confirmation Number	070319INTEFSW13503200
Deposit Account	505522
Authorized User	Colleen Maroney
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	273252US8_IDS.pdf	1034637 88b292a4ff2eb4eb5ae9fc54ab13cf89fc247dfd	no	4
Warnings:					
Information:					
2	Foreign Reference	273252US8_JP2006042510A.pdf	6499598 2a2a1f038297273ce39260d93b41fa001c4420555	no	12
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30783 6f4499dd86028ffe2fca553122dffe039baae97	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7565018		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

131278 7590 06/05/2019

Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

EXAMINER
GLASS, ERICK DAVID

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 06/05/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-US-8	9433

TITLE OF INVENTION: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	09/05/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

131278 7590 06/05/2019
Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-US-8	9433

TITLE OF INVENTION: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	09/05/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
GLASS, ERICK DAVID	2837	318-139000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Toyota v. Bunker Hill IPR2026-00250
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-US-8	9433

131278 7590 06/05/2019

Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

EXAMINER	
GLASS, ERICK DAVID	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 06/05/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

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Toyota v. Bunker Hill IPR2026-00250
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OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/799,045	Applicant(s) King et al.	
	Examiner ERICK D GLASS	Art Unit 2837	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 5/9/19.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-5,7-16 and 18-22 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 5/9/19.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ERICK D GLASS/
Primary Examiner, Art Unit 2837

Notice of Pre-AIA or AIA Status

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

With respect to claim 1, the Prior Art does not teach an energy storage system;

a bi-directional DC/DC converter coupled to the energy storage system;

a first traction motor coupled to the bi-directional DC/DC converter; a second traction motor coupled to the bi-directional DC/DC converter; a transmission device coupled to the first traction motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction motor and the transmission device such that the output of the second traction motor bypasses the transmission device; an internal combustion engine coupled to the transmission device via a path that does not include the first traction motor and second traction motor; and

a control system configured to selectively: operate the first traction motor and second traction motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first traction motor as a generator to generate electrical power while operating the second traction motor to drive the vehicle through the gear assembly.

With respect to claim 14, the Prior Art does not teach an energy storage system; a bi-directional DC/DC converter coupled to the energy storage system, the bi-directional DC/DC converter coupled to both a first DC bus and a second DC bus of a DC bus assembly;

a first traction drive system coupled to the first DC bus, the first traction drive system comprising a first inverter coupled to a first electric motor; a second traction drive system coupled to the second DC bus, the second traction drive system comprising a second inverter coupled to a second electric motor;

a transmission device coupled to the first traction drive system, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction drive system and the transmission device such that the output of the second traction motor bypasses the transmission device;

an internal combustion engine coupled to the transmission device via a path that does not include the first electric motor and second electric motor; and

a control system configured to selectively: operate the first traction drive system and second traction drive system to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first traction drive system to generate electric power while operating the second traction drive system to drive the vehicle through the gear assembly.

With respect to claim 21, the Prior Art does not teach an energy storage system; a buck/boost converter coupled to the energy storage system; a first inverter coupled to the buck/boost converter; a second inverter coupled to the buck/boost converter; a first AC motor coupled to the first inverter; a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction AC motor and the transmission device such that the output of the second AC motor bypasses the transmission device;

an internal combustion engine coupled to the transmission device via a path that does not include the first AC motor and second AC motor; and

a control system configured to selectively: operate the first AC motor and second AC motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first

AC motor as a generator to generate electrical power while operating the second AC motor to drive the vehicle through the gear assembly.

With respect to claim 22, the Prior Art does not teach an energy storage system; a buck/boost converter coupled to the energy storage system; a first inverter coupled to the buck/boost converter; a second inverter coupled to the buck/boost converter; a first AC motor coupled to the first inverter; a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second AC motor and the transmission device such that the output of the second AC motor bypasses the transmission device; an internal combustion engine coupled to the transmission device; and

a control system configured to selectively: operate the first AC motor and second AC motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first AC motor as a generator to generate electrical power while operating the second AC motor to drive the vehicle through the gear assembly.

Claims 1-5, 7-16, 18-22 are allowable.

Conclusion

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERICK DAVID GLASS whose telephone number is (571)272-8395. The examiner can normally be reached on Mon-Fri_8-5pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eduardo Colon-Santana can be reached on 571-272-2060. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERICK D GLASS/
Primary Examiner, Art Unit 2837

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

CPC - Searched*		
Symbol	Date	Examiner
B60L11/1803, B60L7/14, B60L11/005	7/8/18	EG

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
318	139	7/8/18	EG

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
searched inventor, ids and please see attached search sheet	7/8/18	EG
updated	11/15/18	EG
updated	03/10/2019	EG
updated	05/23/2019	EG

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
B60L	11/1803	05/23/2019	EG

/ERICK GLASS/ Primary Examiner.Art Unit 2837	

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 186 of 798

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

CPC									
Symbol								Type	Version
B60L	/	11	/	1803				F	2013-01-01
B60L	/	7	/	14				I	2013-01-01
B60L	/	15	/	007				I	2013-01-01
B60L	/	15	/	2045				I	2013-01-01
B60L	/	50	/	40				I	2019-02-01
B60L	/	50	/	16				I	2019-02-01
B60L	/	50	/	51				I	2019-02-01
B60L	/	58	/	18				I	2019-02-01
B60L	/	58	/	21				I	2019-02-01
B60L	/	58	/	20				I	2019-02-01
Y10T	/	29	/	49117				A	2015-01-15
B60L	/	2210	/	12				A	2013-01-01
B60L	/	2210	/	14				A	2013-01-01
B60L	/	2210	/	40				A	2013-01-01
Y02T	/	10	/	7077				A	2013-01-01
Y02T	/	10	/	7005				A	2013-01-01
Y02T	/	10	/	7241				A	2013-01-01
Y02T	/	10	/	7022				A	2013-01-01
Y02T	/	10	/	7233				A	2013-01-01
Y02T	/	10	/	7225				A	2013-01-01
Y02T	/	10	/	7066				A	2013-01-01
Y02T	/	10	/	7061				A	2013-01-01
Y02T	/	10	/	7283				A	2013-01-01
Y02T	/	10	/	645				A	2013-01-01
Y02T	/	10	/	70				A	2013-01-01

CPC Combination Sets									
Symbol								Type	Set	Ranking	Version
	/		/								

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	23 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office — Part of Paper No.: 20190518

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 187 of 798

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H02P	/	1	/	00
H02P	/	3	/	00
H02P	/	5	/	00

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
318	139

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	23 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office — Part of Paper No.: 20190518

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 188 of 798

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	17	19										
2	2	10	11	18	20										
3	3	11	12	19	21										
4	4	12	13	20	22										
5	5	13	14												
-	6	14	15												
6	7	15	16												
7	8	-	17												
8	9	16	18												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	23 May 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office — Part of Paper No.: 20190518

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 189 of 798

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	2	(("7246672") or ("8535200")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/05/24 09:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	11907	(HEV (hybrid) near4 (vehicle car automobile)) and ((second two dual twin auxillary) near5 (motor))	US-PGPUB	OR	ON	2019/05/24 09:32
L2	2084	1 and (cvt (variable near3 transmission))	US-PGPUB	OR	OFF	2019/05/24 09:32
L3	13	2 and (bypass$4 near4 (switch circuit))	US-PGPUB	OR	ON	2019/05/24 09:33

5/24/2019 9:34:01 AM
C:\Users\eglass\Documents\EAST\Workspaces\15799045.wsp

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/E.G./	1	7246672	B2	2007-07-24	Shirai et al.	
/E.G./	2	8535200	B2	2013-09-17	Vyas et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature	/ERICK D GLASS/	Date Considered	05/18/2019

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-05-09
Name/Print	Craig M. Drachtman	Registration Number	73,016

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15799045	Filing Date	2017-10-31	Docket Number (if applicable)	273252-US-8	Art Unit	2837
First Named Inventor	Robert Dean King			Examiner Name	GLASS, ERICK DAVID		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 505522

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-05-09
Name	Craig M. Drachtman	Registration Number	73016

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7246672	B2	2007-07-24	Shirai et al.	
	2	8535200	B2	2013-09-17	Vyas et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-US-8

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-05-09
Name/Print	Craig M. Drachtman	Registration Number	73,016

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	15799045
Filing Date:	31-Oct-2017
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Filer:	Craig Michael Drachtman/Colleen Maroney
Attorney Docket Number:	273252-US-8
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	1900	1900
		Total in USD ($)		**1900**

Electronic Acknowledgement Receipt	
EFS ID:	35967325
Application Number:	15799045
International Application Number:	
Confirmation Number:	9433
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	273252-US-8
Receipt Date:	09-MAY-2019
Filing Date:	31-OCT-2017
Time Stamp:	14:50:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1900
RAM confirmation Number	051019INTEFSW14512900
Deposit Account	505522
Authorized User	Colleen Maroney
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	273252US8_RCE.pdf	1350127 994d24499dcfa3ea62c09524fe7ef6235ffc6d68	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	273252US8_IDS.pdf	1034576 6401f8614177f6062b7c86a8829b5cc6cd8c719b	no	4
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30745 b5876cd6256c6f07c3f3e05d761a00d0783ec5b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2415448		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

131278 7590 03/20/2019
GE GLOBAL PATENT OPERATION
GE VENTURES-LICENSING (ME 131278)
901 MAIN AVENUE
NORWALK, CT 06851

EXAMINER
GLASS, ERICK DAVID

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 03/20/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-8	9433

TITLE OF INVENTION: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	06/20/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 206 of 798

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

131278 7590 03/20/2019
GE GLOBAL PATENT OPERATION
GE VENTURES-LICENSING (ME 131278)
901 MAIN AVENUE
NORWALK, CT 06851

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-8	9433

TITLE OF INVENTION: VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	06/20/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
GLASS, ERICK DAVID	2837	318-139000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 207 of 798

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-8	9433

131278 7590 03/20/2019

GE GLOBAL PATENT OPERATION
GE VENTURES-LICENSING (ME 131278)
901 MAIN AVENUE
NORWALK, CT 06851

EXAMINER	
GLASS, ERICK DAVID	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 03/20/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 208 of 798

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/799,045	Applicant(s) King et al.	
	Examiner ERICK D GLASS	Art Unit 2837	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 2/20/19.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-5,7-16 and 18-22 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 1/22/19,2/20/19,3/6/19.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ERICK D GLASS/
Primary Examiner, Art Unit 2837

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. The application has been amended as follows: Claims 3-4 and 16 are rejoined.

Allowance

4. Claims 1-5, 7-16, and 18-22 allowable. The restriction requirement, as set forth in the Office action mailed on 4/11/18 , has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim.**

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

5. With respect to claim 1, the Prior Art does not teach an energy storage system; a bi-directional DC/DC converter coupled to the energy storage system;

a first traction motor coupled to the bi-directional DC/DC converter; a second traction motor coupled to the bi-directional DC/DC converter; a transmission device coupled to the first traction motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction motor and the transmission device such that the output of the second traction motor bypasses the transmission device; an internal combustion engine coupled to the transmission device via a path that does not include the first traction motor and second traction motor; and

a control system configured to selectively: operate the first traction motor and second traction motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first traction motor as a generator to generate electrical power while operating the second traction motor to drive the vehicle through the gear assembly.

6. With respect to claim 14, the Prior Art does not teach an energy storage system; a bi-directional DC/DC converter coupled to the energy storage system, the bi-directional DC/DC converter coupled to both a first DC bus and a second DC bus of a DC bus assembly;

a first traction drive system coupled to the first DC bus, the first traction drive system comprising a first inverter coupled to a first electric motor; a second traction drive system coupled to the second DC bus, the second traction drive system comprising a second inverter coupled to a second electric motor;

a transmission device coupled to the first traction drive system, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction drive system and the transmission device such that the output of the second traction motor bypasses the transmission device;

an internal combustion engine coupled to the transmission device via a path that does not include the first electric motor and second electric motor; and

a control system configured to selectively: operate the first traction drive system and second traction drive system to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first traction drive system to generate electric power while operating the second traction drive system to drive the vehicle through the gear assembly.

7. With respect to claim 21, the Prior Art does not teach an energy storage system; a buck/boost converter coupled to the energy storage system; a first inverter coupled to the buck/boost converter; a second inverter coupled to the buck/boost converter; a first AC motor coupled to the first inverter; a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second traction AC motor and the transmission device such that the output of the second AC motor bypasses the transmission device;

an internal combustion engine coupled to the transmission device via a path that does not include the first AC motor and second AC motor; and

a control system configured to selectively: operate the first AC motor and second AC motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first

AC motor as a generator to generate electrical power while operating the second AC motor to drive the vehicle through the gear assembly.

8. With respect to claim 22, the Prior Art does not teach an energy storage system; a buck/boost converter coupled to the energy storage system; a first inverter coupled to the buck/boost converter; a second inverter coupled to the buck/boost converter; a first AC motor coupled to the first inverter; a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor, the transmission device configured as an electrically variable transmission (EVT) that comprises an arrangement of planetary gears;

a gear assembly coupled between the second AC motor and the transmission device such that the output of the second AC motor bypasses the transmission device; an internal combustion engine coupled to the transmission device; and

a control system configured to selectively: operate the first AC motor and second AC motor to drive the vehicle through the transmission device and gear assembly, respectively; and operate the first AC motor as a generator to generate electrical power while operating the second AC motor to drive the vehicle through the gear assembly.

Claims 1-5, 7-16, 18-22 are allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERICK DAVID GLASS whose telephone number is (571)272-8395. The examiner can normally be reached on Mon-Fri_8-5pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eduardo Colon-Santana can be reached on 571-272-2060. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERICK D GLASS/
Primary Examiner, Art Unit 2837

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

CPC									
Symbol								Type	Version
B60L	/	11	/	1803				F	2013-01-01
B60L	/	7	/	14				I	2013-01-01
B60L	/	15	/	007				I	2013-01-01
B60L	/	15	/	2045				I	2013-01-01
B60L	/	50	/	40				I	2019-02-01
B60L	/	50	/	16				I	2019-02-01
B60L	/	50	/	51				I	2019-02-01
B60L	/	58	/	18				I	2019-02-01
B60L	/	58	/	21				I	2019-02-01
B60L	/	58	/	20				I	2019-02-01
Y10T	/	29	/	49117				A	2015-01-15
B60L	/	2210	/	12				A	2013-01-01
B60L	/	2210	/	14				A	2013-01-01
B60L	/	2210	/	40				A	2013-01-01
Y02T	/	10	/	7077				A	2013-01-01
Y02T	/	10	/	7005				A	2013-01-01
Y02T	/	10	/	7241				A	2013-01-01
Y02T	/	10	/	7022				A	2013-01-01
Y02T	/	10	/	7233				A	2013-01-01
Y02T	/	10	/	7225				A	2013-01-01
Y02T	/	10	/	7066				A	2013-01-01
Y02T	/	10	/	7061				A	2013-01-01
Y02T	/	10	/	7283				A	2013-01-01
Y02T	/	10	/	645				A	2013-01-01
Y02T	/	10	/	70				A	2013-01-01

CPC Combination Sets									
Symbol								Type	Set	Ranking	Version
	/		/								

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	11 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office

Part of Paper No.: 20190310

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 216 of 798

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H02P	/	1	/	00	
H02P	/	3	/	00	
H02P	/	5	/	00	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
318	139

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	11 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office — Part of Paper No.: 20190310

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 217 of 798

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	17	19										
2	2	10	11	18	20										
3	3	11	12	19	21										
4	4	12	13	20	22										
5	5	13	14												
-	6	14	15												
6	7	15	16												
7	8	-	17												
8	9	16	18												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERICK D GLASS/ Primary Examiner, Art Unit 2837	11 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	fig. 1

U.S. Patent and Trademark Office

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Toyota v. Bunker Hill IPR2026-00250
Page 218 of 798

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/799,045	King et al.
	Examiner	Art Unit
	ERICK D GLASS	2837

CPC - Searched*		
Symbol	Date	Examiner
B60L11/1803, B60L7/14, B60L11/005	7/8/18	EG

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
318	139	7/8/18	EG

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
searched inventor, ids and please see attached search sheet	7/8/18	EG
updated	11/15/18	EG
updated	03/10/2019	EG

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
B60L	11/1803	03/10/2019	EG

/ERICK GLASS/ Primary Examiner.Art Unit 2837	

Petitioner EX1007
Toyota v. Bunker Hill IPR2026-00250
Page 219 of 798

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BIB DATA SHEET

CONFIRMATION NO. 9433

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/799,045	10/31/2017 RULE	318	2837	273252-8

APPLICANTS
General Electric Company, Schenectady, NY;

INVENTORS
Robert Dean King, Schenectady, NY;
Zhihao Li, Rexford, NY;

**** CONTINUING DATA ***************************
This application is a CON of 14/168,224 01/30/2014 PAT 9834098

**** FOREIGN APPLICATIONS *************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
11/28/2017

Foreign Priority claimed ❑ Yes ☑ No 35 USC 119(a-d) conditions met ❑ Yes ☑ No Verified and Acknowledged /ERICK DAVID GLASS/ Examiner's Signature	❑ Met after Allowance EG Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		NY	7	22	4

ADDRESS

GE GLOBAL PATENT OPERATION
GE VENTURES-LICENSING (ME 131278)
901 MAIN AVENUE
NORWALK, CT 06851
UNITED STATES

TITLE

VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME

FILING FEE RECEIVED	FEES: Authority has been given in Paper	❑ All Fees
2180	No._____ to charge/credit DEPOSIT ACCOUNT	❑ 1.16 Fees (Filing)
	No._____ for following:	❑ 1.17 Fees (Processing Ext. of time)
		❑ 1.18 Fees (Issue)
		❑ Other _____
		❑ Credit

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-8

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100194318	A1	2010-08-05	Aso	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2007-174867	JP	A	2007-07-05	Toyota Motor Corp	With English Abstract	
	2	H5-176411	JP	A	1991-12-20	Toyota Motor Corp	With English Abstract	
	3	2009-522167	JP	A	2006-12-20	General Electric Company	With English Abstract	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Robert Dean King
	Art Unit	2837
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	Attorney Docket Number	273252-8

	4	2005-143274	JP	A	2005-06-02	Nissan Motor	With English Abstract	
	5	2003-244801A	JP	a	2003-08-29	TOYOTA MOTOR CORP	With English Abstract	
	6	2006-230071	JP	A	2006-08-31	TOYOTA MOTOR CORP	With English Abstract	
	7	2502773	EP	A2	2012-09-26	General Electric Company		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	Copy of Summons for corresponding EP Application No.15152810.6 dated June 4, 2018.	
	2	Copy of Notification of Reasons for Refusal for corresponding JP Application No.: 2015-009031 dated December 28, 2018.	
	3	Copy of Search Report for corresponding JP Application N.: 2015-009031 dated December 18, 2018.	

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EXAMINER SIGNATURE

Examiner Signature	/ERICK D GLASS/	Date Considered	03/11/2019

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-8

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-8

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

× The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-01-22
Name/Print	Craig M. Drachtman	Registration Number	73016

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.G./

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-8

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050082992	A1	2005-04-21	Aizawa et al.	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-8

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Examiner Signature	/ERICK D GLASS/	Date Considered	03/11/2019

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-02-20
Name/Print	Craig M. Drachtman	Registration Number	73016

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	2	(("20100194318") or ("20050082992")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/03/10 14:07

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	62122	(hybrid) near4 (vehicle car automobile)	US-PGPUB	OR	ON	2019/03/10 13:41
L2	141149	(second two dual twin auxillary) near5 (motor)	US-PGPUB	OR	ON	2019/03/10 13:42
L3	7478	1 and 2 and engine and transmission	US-PGPUB	OR	ON	2019/03/10 13:53
L4	2023	3 and (cvt (variable near3 transmission))	US-PGPUB	OR	OFF	2019/03/10 13:54
L5	13	4 and (bypass$4 near4 (switch circuit))	US-PGPUB	OR	ON	2019/03/10 13:54

3/ 10/ 2019 2:08:33 PM
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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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Application Number	15799045
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First Named Inventor	Robert
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-US-8

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	5	2009183108	JP	A	2009-08-13	TOYOTA MOTOR CORP	With English Abstract	
	6	2013188106	JP	A	2013-09-19	TOYOTA MOTOR CORP	With English Abstract	

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Copy of Notice of Allowance issued in connection with corresponding KR Application no. 1020150009219 dated September 21, 2018.	

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Examiner Signature	/ERICK D GLASS/	Date Considered	03/11/2019

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-03-06
Name/Print	Craig M. Drachtman	Registration Number	73,016

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Bibliographic data: JP2007274785 (A) — 2007-10-18

POWER SYSTEM FOR VEHICLE DRIVE

Inventor(s): SOMA TAKAYA; YOSHIDA HIROSHI; SHIGEKARI TAKESHI ± (SOMA TAKAYA, ; YOSHIDA HIROSHI, ; SHIGEKARI TAKESHI)

Applicant(s): TOYOTA MOTOR CORP ± (TOYOTA MOTOR CORP)

Classification: - international:***B60L11/18; H01M10/44; H02J7/34***
- cooperative: Y02T10/7005; Y02T10/7022; Y02T10/7216; Y02T10/92

Application number: JP20060094888 20060330 Global Dossier

Priority number (s): JP20060094888 20060330

Abstract of JP2007274785 (A)

PROBLEM TO BE SOLVED: To provide a power system for vehicle drive which improves energy efficiency, mounting a capacitor. ;SOLUTION: The power system for vehicle drive is equipped with a main battery B1, a capacitor 40, an auxiliary battery B2 which is lower in power voltage than the main battery B1, a DC/DC converter 50, and a controller 30. The controller 30 controls the DC/DC converter 50 so that the auxiliary battery B2 may be charged by the energy that the capacitor 40 accumulated, according to the stop instruction of the vehicle, in case that the power reception of the main battery B1 is limited. Preferably, the controller 30 controls the step-up converter 12 to step down the voltage of the capacitor 40, according to the stop instruction, and outputs it to the side of the main battery B1 thus charging the main battery B1 or the auxiliary battery B2. ;COPYRIGHT: (C)2008,JPO&INPIT

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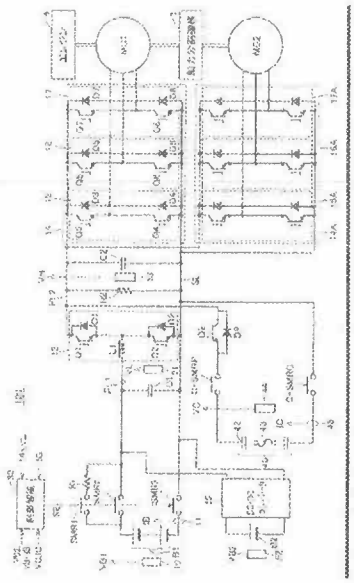
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(54)【発明の名称】車両駆動用電源システム

(57)【要約】
【課題】エネルギ効率が改善された、キャパシタを搭載する車両駆動用電源システムを提供する。
【解決手段】車両駆動用電源システムは、メインバッテリＢ１と、キャパシタ４０と、メインバッテリＢ１よりも電源電圧が低い補機バッテリＢ２と、ＤＣ／ＤＣコンバータ５０と、制御装置３０とを備える。制御装置３０は、メインバッテリＢ１の電力受入れが制限される場合には、車両の停止指示に応じて、キャパシタ４０が蓄積していたエネルギによって補機バッテリＢ２の充電が行なわれるようにＤＣ／ＤＣコンバータ５０を制御する。好ましくは、制御装置３０は、停止指示に応じて昇降圧コンバータ１２にキャパシタ４０の電圧を降圧させてメインバッテリＢ１側に出力させメインバッテリＢ１または補機バッテリＢ２の充電を行なわせる。
【選択図】図１



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【特許請求の範囲】
【請求項1】
車両駆動用電源システムであって、
主バッテリと、
前記主バッテリから車両負荷に電力を供給する電力供給経路上に接続されるキャパシタと、
前記主バッテリよりも電源電圧が低い補機バッテリと、
前記補機バッテリと前記キャパシタとの間で電圧変換を行なう電圧変換器と、
前記電圧変換器の制御を行なう制御装置とを備え、
前記制御装置は、前記主バッテリの電力受入れが制限される場合には、車両を走行可能状態から走行不可状態に移行させる停止指示に応じて、前記キャパシタが蓄積していたエネルギによって前記補機バッテリの充電が行なわれるように前記電圧変換器を制御する、車両駆動用電源システム。
【請求項2】
前記主バッテリと前記キャパシタとの間に配置され、前記主バッテリの電圧を昇圧して前記キャパシタに供給し、かつ前記キャパシタの電圧を降圧して前記主バッテリに供給する昇降圧コンバータをさらに備え、
前記電圧変換器は、前記昇降圧コンバータの前記主バッテリ側に接続され、
前記制御装置は、前記停止指示に応じて前記昇降圧コンバータに前記キャパシタの電圧を降圧させて前記主バッテリ側に出力させ前記主バッテリまたは前記補機バッテリの充電を行なわせる、請求項１に記載の車両駆動用電源システム。
【請求項3】
前記キャパシタを前記電力供給経路に接続する第１のリレーをさらに備え、
前記制御装置は、前記補機バッテリへの充電が行なわれて前記キャパシタの電圧が前記主バッテリの電圧に低下したときに、前記第１のリレーを切離す、請求項１に記載の車両駆動用電源システム。
【請求項4】
前記主バッテリを前記電力供給経路に接続する第２のリレーをさらに備え、
前記制御装置は、前記停止指示に応じて前記第２のリレーを切離す、請求項３に記載の車両駆動用電源システム。
【請求項5】
前記キャパシタは、
直列接続される複数の電気二重層コンデンサを含む、請求項１に記載の車両駆動用電源システム。

【発明の詳細な説明】
【技術分野】
【0001】
この発明は、車両駆動用電源システムに関し、特に二次電池とキャパシタとを備える車両駆動用電源システムに関する。
【背景技術】
【0002】
駆動力源としてモータを備える電気自動車およびハイブリッド車両が近年注目されている。たとえば、特開２００２－１７０４８号公報（特許文献１）は、メインバッテリと補機バッテリとキャパシタとを含む車両の電源装置を開示している。
【特許文献1】特開２００２－１７０４８号公報
【発明の開示】
【発明が解決しようとする課題】
【0003】
蓄電装置としてメインバッテリとキャパシタとを搭載する車両では、車両の電源システムをオフする際に、キャパシタのエネルギをメインバッテリに移すことが考えられる。キ

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キャパシタの大容量化が進み特性も改善されてきているが、現在のところ、キャパシタの方がメインバッテリに比べて自己放電が進みやすい。したがって、キャパシタからメインバッテリにエネルギを移すことで、システム起動後に移したエネルギを再活用可能となる確率が高まり燃費の改善につながる。

【０００４】

しかしながら、メインバッテリも常にキャパシタのエネルギを受入れ可能とは限らない。そのような場合には、キャパシタのエネルギをメインバッテリに移すことができず、たとえば熱エネルギとして無駄に放出するしかなかった。

【０００５】

この発明の目的は、エネルギ効率が改善された車両駆動用電源システムを提供することである。

【課題を解決するための手段】

【０００６】

この発明は、要約すると、車両駆動用電源システムであって、主バッテリと、主バッテリから車両負荷に電力を供給する電力供給経路上に接続されるキャパシタと、主バッテリよりも電源電圧が低い補機バッテリと、補機バッテリとキャパシタとの間で電圧変換を行なう電圧変換器と、電圧変換器の制御を行なう制御装置とを備える。制御装置は、主バッテリの電力受入れが制限される場合には、車両を走行可能状態から走行不可状態に移行させる停止指示に応じて、キャパシタが蓄積していたエネルギによって補機バッテリの充電が行なわれるように電圧変換器を制御する。

【０００７】

好ましくは、車両駆動用電源システムは、主バッテリとキャパシタとの間に配置され、主バッテリの電圧を昇圧してキャパシタに供給し、かつキャパシタの電圧を降圧して主バッテリに供給する昇降圧コンバータをさらに備える。電圧変換器は、昇降圧コンバータの主バッテリ側に接続される。制御装置は、停止指示に応じて昇降圧コンバータにキャパシタの電圧を降圧させて主バッテリ側に出力させ主バッテリまたは補機バッテリの充電を行なわせる。

【０００８】

好ましくは、車両駆動用電源システムは、キャパシタを電力供給経路に接続する第１のリレーをさらに備える。制御装置は、補機バッテリへの充電が行なわれてキャパシタの電圧が主バッテリの電圧に低下したときに、第１のリレーを切離す。

【０００９】

より好ましくは、車両駆動用電源システムは、主バッテリを電力供給経路に接続する第２のリレーをさらに備える。制御装置は、停止指示に応じて第２のリレーを切離す。

【００１０】

好ましくは、キャパシタは、直列接続される複数の電気二重層コンデンサを含む。

【発明の効果】

【００１１】

本発明によれば、電源システムのエネルギ効率が改善され、車両の燃費が向上する。

【発明を実施するための最良の形態】

【００１２】

以下、本発明の実施の形態について図面を参照しながら詳細に説明する。なお、図中同一または相当部分には同一符号を付してその説明は繰返さない。

【００１３】

図１は、本発明の実施の形態に係る車両の構成を示す回路図である。

図１を参照して、車両１００は、メインバッテリＢ１と、キャパシタ４０と、エンジン４と、モータジェネレータＭＧ１，ＭＧ２と、動力分割機構３と、制御装置３０とを含む。モータジェネレータＭＧ２の回転軸は、図示しない減速ギヤや差動ギヤを介して車輪を駆動する。

【００１４】

動力分割機構３は、エンジン４とモータジェネレータＭＧ１，ＭＧ２に結合され、これらの間で動力を分配する機構である。たとえば動力分割機構としてはサンギヤ、プラネタリキャリヤ、リングギヤの３つの回転軸を有する遊星歯車機構を用いることができる。この３つの回転軸がエンジン４、モータジェネレータＭＧ１，ＭＧ２の各回転軸にそれぞれ接続される。なお動力分割機構３の内部にモータジェネレータＭＧ２の回転軸に対する減速機をさらに組み込んでもよい。

【0015】

車両１００は、さらに、メインバッテリＢ１の負極と接地ラインＳＬとの間に接続されるシステムメインリレーＳＭＲ３と、メインバッテリＢ１の正極と電源ラインＰＬ１との間に接続されるシステムメインリレーＳＭＲ２と、メインバッテリＢ１の正極と電源ラインＰＬ１との間に直列に接続されるシステムメインリレーＳＭＲ１および制限抵抗Ｒ１とを含む。システムメインリレーＳＭＲ１～ＳＭＲ３は、制御装置３０から与えられる制御信号ＳＥに応じて導通／非導通状態が制御される。

【0016】

車両１００は、さらに、メインバッテリＢ１の端子間の電圧ＶＢを測定する電圧センサ１０と、メインバッテリＢ１に流れる電流ＩＢを検知する電流センサ１１とを含む。

【0017】

メインバッテリＢ１としては、ニッケル水素、リチウムイオン等の二次電池などを用いることができる。

【0018】

車両１００は、さらに、電源ラインＰＬ１と接地ラインＳＬ間に接続される平滑用コンデンサＣ１と、平滑用コンデンサＣ１の両端間の電圧ＶＬを検知して制御装置３０に対して出力する電圧センサ２１と、平滑用コンデンサＣ１の端子間電圧を昇圧する昇降圧コンバータ１２と、昇降圧コンバータ１２によって昇圧された電圧を平滑化する平滑用コンデンサＣ２と、平滑用コンデンサＣ２の端子間電圧ＶＨを検知して制御装置３０に出力する電圧センサ１３と、電源ラインＰＬ２と接地ラインＳＬとの間に接続されるディスチャージ用抵抗Ｒ２と、昇降圧コンバータ１２から与えられる直流電圧を三相交流に変換してモータジェネレータＭＧ１に出力するインバータ１４とを含む。

【0019】

昇降圧コンバータ１２は、一方端が電源ラインＰＬ１に接続されるリアクトルＬ１と、電源ラインＰＬ２と接地ラインＳＬ間に直列に接続されるＩＧＢＴ素子Ｑ１，Ｑ２と、ＩＧＢＴ素子Ｑ１，Ｑ２にそれぞれ並列に接続されるダイオードＤ１，Ｄ２とを含む。

【0020】

リアクトルＬ１の他方端はＩＧＢＴ素子Ｑ１のエミッタおよびＩＧＢＴ素子Ｑ２のコレクタに接続される。ダイオードＤ１のカソードはＩＧＢＴ素子Ｑ１のコレクタと接続され、ダイオードＤ１のアノードはＩＧＢＴ素子Ｑ１のエミックと接続される。ダイオードＤ２のカソードはＩＧＢＴ素子Ｑ２のコレクタと接続され、ダイオードＤ２のアノードはＩＧＢＴ素子Ｑ２のエミッタと接続される。

【0021】

インバータ１４は、昇降圧コンバータ１２から昇圧された電圧を受けて、たとえばエンジン４を始動させるためにモータジェネレータＭＧ１を駆動する。また、インバータ１４は、エンジン４から伝達される機械的動力によってモータジェネレータＭＧ１で発電された電力を昇降圧コンバータ１２に戻す。このとき昇降圧コンバータ１２は、降圧回路として動作するように制御装置３０によって制御される。

【0022】

インバータ１４は、Ｕ相アーム１５と、Ｖ相アーム１６と、Ｗ相アーム１７とを含む。Ｕ相アーム１５，Ｖ相アーム１６およびＷ相アーム１７は、電源ラインＰＬ２と接地ラインＳＬとの間に並列に接続される。

【0023】

Ｕ相アーム１５は、電源ラインＰＬ２と接地ラインＳＬとの間に直列接続されたＩＧＢ

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Ｔ素子Ｑ３，Ｑ４と、ＩＧＢＴ素子Ｑ３，Ｑ４とそれぞれ並列に接続されるダイオードＤ３，Ｄ４とを含む。ダイオードＤ３のカソードはＩＧＢＴ素子Ｑ３のコレクタと接続され、ダイオードＤ３のアノードはＩＧＢＴ素子Ｑ３のエミッタと接続される。ダイオードＤ４のカソードはＩＧＢＴ素子Ｑ４のコレクタと接続され、ダイオードＤ４のアノードはＩＧＢＴ素子Ｑ４のエミッタと接続される。

【0024】

Ｖ相アーム１６は、電源ラインＰＬ２と接地ラインＳＬとの間に直列接続されたＩＧＢＴ素子Ｑ５，Ｑ６と、ＩＧＢＴ素子Ｑ５，Ｑ６とそれぞれ並列に接続されるダイオードＤ５，Ｄ６とを含む。ダイオードＤ５のカソードはＩＧＢＴ素子Ｑ５のコレクタと接続され、ダイオードＤ５のアノードはＩＧＢＴ素子Ｑ５のエミッタと接続される。ダイオードＤ６のカソードはＩＧＢＴ素子Ｑ６のコレクタと接続され、ダイオードＤ６のアノードはＩＧＢＴ素子Ｑ６のエミッタと接続される。

【0025】

Ｗ相アーム１７は、電源ラインＰＬ２と接地ラインＳＬとの間に直列接続されたＩＧＢＴ素子Ｑ７，Ｑ８と、ＩＧＢＴ素子Ｑ７，Ｑ８とそれぞれ並列に接続されるダイオードＤ７，Ｄ８とを含む。ダイオードＤ７のカソードはＩＧＢＴ素子Ｑ７のコレクタと接続され、ダイオードＤ７のアノードはＩＧＢＴ素子Ｑ７のエミックと接続される。ダイオードＤ８のカソードはＩＧＢＴ素子Ｑ８のコレクタと接続され、ダイオードＤ８のアノードはＩＧＢＴ素子Ｑ８のエミッタと接続される。

【0026】

モータジェネレータＭＧ１は、三相の永久磁石同期モータであり、Ｕ，Ｖ，Ｗ相の３つのコイルは各々一方端が中点に共に接続されている。そして、Ｕ相コイルの他方端がＩＧＢＴ素子Ｑ３，Ｑ４の接続ノードに接続される。またＶ相コイルの他方端がＩＧＢＴ素子Ｑ５，Ｑ６の接続ノードに接続される。またＷ相コイルの他方端がＩＧＢＴ素子Ｑ７，Ｑ８の接続ノードに接続される。

【0027】

車両１００は、さらに、昇降圧コンバータ１２に対してインバータ１４と並列的に接続されるインバータ１４Ａと、昇降圧コンバータ１２による昇圧後の電力を蓄積するキャパシタ４０と、電源ラインＰＬ２にキャパシタ４０の一方電極を接続するシステムメインリレーＣ－ＳＭＲＰと、接地ラインＳＬにキャパシタ４０の他方電極を接続するシステムメインリレーＣ－ＳＭＲＧとを含む。

【0028】

車両１００は、負荷であるインバータ１４，１４Ａに接続された電源ラインＰＬ２とキャパシタ４０の電極との間にシステムメインリレーＣ－ＳＭＲＰと直列に接続されたＩＧＢＴ素子Ｑ９と、キャパシタの正電極から電源ラインＰＬ２に向かう向きを順方向としてＩＧＢＴ素子Ｑ９に並列接続されるダイオードＤ９とをさらに備える。

【0029】

図示しないが、システムメインリレーＣ－ＳＭＲＧ，Ｃ－ＳＭＲＰも、制御装置３０から与えられる制御信号ＳＥに応じて導通／非導通状態が制御される。

【0030】

車両１００は、さらに、キャパシタ４０の端子間の電圧ＶＣを測定する電圧センサ４４と、キャパシタ４０に流れる電流ＩＣを検知する電流センサ４６と、キャパシタ４０の温度ＴＣを検知する温度センサ４５とを含む。

【0031】

インバータ１４Ａは車輪を駆動するモータジェネレータＭＧ２に対して昇降圧コンバータ１２の出力する直流電圧を三相交流に変換して出力する。またインバータ１４Ａは、回生制動に伴い、モータジェネレータＭＧ２において発電された電力を昇降圧コンバータ１２に戻す。このとき昇降圧コンバータ１２は降圧回路として動作するように制御装置３０によって制御される。

【0032】

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インバータ１４Ａは、Ｕ相アーム１５Ａと、Ｖ相アーム１６Ａと、Ｗ相アーム１７Ａとを含む。Ｕ相アーム１５Ａ，Ｖ相アーム１６Ａおよびｗ相アーム１７Ａは、電源ラインＰＬ２と接地ラインＳＬとの間に並列に接続される。Ｕ相アーム１５Ａ，Ｖ相アーム１６Ａおよびｗ相アーム１７Ａの各構成は、Ｕ相アーム１５，Ｖ相アーム１６およびＷ相アーム１７とそれぞれ同様であり、詳細な説明は繰返さない。

【0033】

車両１００は、さらに、ヘッドランプ等の補機類に電力供給を行なう１２Ｖの補機バッテリＢ２と、電源ラインＰＬ１と補機バッテリＢ２および補機類との間に接続されるＤＣ／ＤＣコンバータ５０と、補機バッテリＢ２の電圧ＶＢ２を測定する電圧センサ５２とを含む。補機類には、ヘッドライトや各種ＥＣＵの電源等が含まれる。

【0034】

ＤＣ／ＤＣコンバータ５０は、制御装置３０から与えられる降圧指示に応じて、電源ラインＰＬ２の電圧を降圧して補機バッテリＢ２への充電や補機類への電力供給を行なうことが可能である。また、ＤＣ／ＤＣコンバータ５０は、制御装置３０から与えられる昇圧指示に応じて、補機バッテリＢ２の電圧を昇圧して電源ラインＰＬ２に対して供給することも可能である。

【0035】

制御装置３０は、２つのモータジェネレータのトルク指令値、モータ回転数、モータ電流値と、電圧ＶＢ，ＶＨ，ＶＣ、電流ＩＢ，ＩＣの各値と、起動信号ＩＧとを受ける。そして制御装置３０は、昇降圧コンバータ１２に対して昇圧指示、降圧指示および動作禁止指示を出力する。

【0036】

さらに、制御装置３０は、インバータ１４に対して、昇降圧コンバータ１２の出力である直流電圧をモータジェネレータＭＧ１を駆動するための交流電圧に変換する駆動指示と、モータジェネレータＭＧ１で発電された交流電圧を直流電圧に変換して昇降圧コンバータ１２側に戻す回生指示とを出力する。

【0037】

同様に制御装置３０は、インバータ１４Ａに対して直流電圧をモータジェネレータＭＧ２を駆動するための交流電圧に変換する駆動指示と、モータジェネレータＭＧ２で発電された交流電圧を直流電圧に変換して昇降圧コンバータ１２側に戻す回生指示とを出力する。

【0038】

キャパシタ４０は、平滑用コンデンサＣ２よりも容量が大きい蓄電装置であり、たとえば直列接続される複数の電気二重層コンデンサ４２とその間に接続されるフューズ４３とを含む。なお、電気二重層コンデンサはエネルギ密度が高いが、１セル当たりの耐圧が２．５～２．７Ｖ程度であるので、昇降圧コンバータ１２が出力する３００～６５０Ｖ程度の電圧に用いるためには各セルに電圧を分担させるために複数の電気二重層コンデンサ４２のセルを直列に接続して用いる必要がある。

【0039】

従来は、昇降圧コンバータ１２の出力電圧のリップルを平滑化するのに十分な程度の容量、たとえば数千μＦの平滑用コンデンサＣ２のみを搭載していたが、これと並列に容量が、たとえば０．５～２．０Ｆ程度のキャパシタ４０をさらに搭載する。

【0040】

これにより、たとえばエンジンを停止させてモータジェネレータのみで走行するＥＶ走行時において追越しをするために急加速を行なおうとした場合に、モータジェネレータＭＧ２が車輪を回転させるパワーを増加しつつ、さらにこれと並行してキャパシタ４０で補填されるパワーでモータジェネレータＭＧ１を回転させてエンジン４を始動し、エンジン４によって発生されるパワーをさらに加速パワーに加えることが可能となる。つまりキャパシタ４０は瞬時における出力可能パワーがメインバッテリＢ１に比べると大きいので、キャパシタ４０によってメインバッテリＢ１の電力を補うことにより加速応答性をさらに

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改善することができる。

【0041】

図１に示される車両駆動用電源システムは、要約すると、メインバッテリＢ１と、メインバッテリＢ１から車両負荷に電力を供給する電力供給経路上に接続されるキャパシタ４０と、メインバッテリＢ１よりも電源電圧が低い補機バッテリＢ２と、補機バッテリＢ２とキャパシタ４０との間で電圧変換を行なうＤＣ／ＤＣコンバータ５０と、ＤＣ／ＤＣコンバータ５０の制御を行なう制御装置３０とを備える。制御装置３０は、メインバッテリＢ１の電力受入れが制限される場合には、車両を走行可能状態から走行不可状態に移行させる停止指示に応じて、キャパシタ４０が蓄積していたエネルギによって補機バッテリＢ２の充電が行なわれるようにＤＣ／ＤＣコンバータ５０を制御する。

【0042】

好ましくは、車両駆動用電源システムは、メインバッテリＢ１とキャパシタ４０との間に配置され、メインバッテリＢ１の電圧を昇圧してキャパシタ４０に供給し、かつキャパシタ４０の電圧を降圧してメインバッテリＢ１に供給する昇降圧コンバータ１２をさらに備える。ＤＣ／ＤＣコンバータ５０は、昇降圧コンバータ１２のメインバッテリＢ１側に接続される。制御装置３０は、停止指示に応じて昇降圧コンバータ１２にキャパシタ４０の電圧を降圧させてメインバッテリＢ１側に出力させメインバッテリＢ１または補機バッテリＢ２の充電を行なわせる。

【0043】

好ましくは、車両駆動用電源システムは、キャパシタ４０を電力供給経路に接続するシステムメインリレーＣ－ＳＭＲＰ，Ｃ－ＳＭＲＧをさらに備える。制御装置３０は、補機バッテリＢ２への充電が行なわれてキャパシタ４０の電圧がメインバッテリＢ１の電圧に低下したときに、システムメインリレーＣ－ＳＭＲＰ，Ｃ－ＳＭＲＧを切離す。

【0044】

より好ましくは、車両駆動用電源システムは、メインバッテリＢ１を電力供給経路に接続するシステムメインリレーＳＭＲ２，ＳＭＲ３をさらに備える。制御装置３０は、停止指示に応じてシステムメインリレーＳＭＲ２，ＳＭＲ３を切離す。

【0045】

図２は、図１の車両１００で実行される電源システムの停止処理の手順を示したフローチャートである。

【0046】

図１，図２を参照して、まずステップＳ１において起動信号ＩＧがオン状態からオフ状態に変化するか否かが監視される。ステップＳ１においてオン状態からオフ状態への変化が検知されなければ、繰り返しステップＳ１において起動信号ＩＧの監視が継続される。

【0047】

一方、ステップＳ１においてオン状態からオフ状態への変化が検知されると、ステップＳ１からステップＳ２に処理が進む。ステップＳ２では、メインバッテリＢ１に充電する余裕があるか否かが判断される。

【0048】

メインバッテリＢ１は、車両制動時の回生電力を回収可能なように、またバッテリ寿命がなるべく長くなるように考慮され蓄電量の上限値と下限値が定められている。その時々の蓄電量が考慮され、制御装置３０によって受入れ可能電力Ｗｉｎが定められている。制御装置３０は、ステップＳ２において、この受入れ可能電力Ｗｉｎが所定値たとえば１０ｋＷより小さいか否かを判断する。

【0049】

したがって、ステップＳ２にてメインバッテリＢ１の蓄電量が管理上限値までまだ余裕がある場合（ステップＳ２でＮＯ）にはステップＳ７に処理が進み、昇降圧コンバータ１２の指令値を下げる。このようにすることにより、キャパシタ４０の電圧がメインバッテリＢ１の電圧より高い場合にはキャパシタ４０からメインバッテリＢ１に充電が行なわれる。

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【0050】
逆に、ステップＳ２にてメインバッテリＢ１の蓄電量が管理上限値に近く余裕が無い場合には（ステップＳ２でＹＥＳ）ステップＳ３に処理が進む。
【0051】
ステップＳ３では、補機バッテリＢ２に充電する余裕があるか否かが判断される。補機バッテリＢ２が鉛蓄電池である場合には、端子間電圧を判断することにより充電状態を判断することができる。したがって、ステップＳ３においては、電圧ＶＢ２が１４Ｖより大きいか否かで補機バッテリＢ２に充電する余裕があるか否かが判断されている。
【0052】
ステップＳ３にて補機バッテリＢ２がほとんど満充電状態であり電力を受入れる余裕が無い場合には（ステップＳ３でＹＥＳ）ステップＳ６に処理が進む。ステップＳ６では、モータジェネレータＭＧ１，ＭＧ２に対してトルクを発生させない電流をステータコイルに流すように制御が行なわれ、熱消費によってキャパシタ４０の余分なチャージを抜く。キャパシタ４０を電極間が高電圧で放置すると寿命に若干の悪影響があるので、不要であれば高電圧をかけておかないほうが良いからである。
【0053】
一方、ステップＳ３において補機バッテリＢ２に電力を受入れる余裕がある場合には（ステップＳ３でＮＯ）ステップＳ４に処理が進む。ステップＳ４ではＤＣ／ＤＣコンバータ５０の補機バッテリＢ２側が現在の補機バッテリＢ２の電圧ＶＢ２より＋αだけ高い電圧になるようにＤＣ／ＤＣコンバータ５０の指令値が設定される。そして、ステップＳ５において昇降圧コンバータ１２の指令値を下げる。このようにすることにより、キャパシタ４０から電源ラインＰＬ１に電流が流れ、その電流が補機バッテリＢ２に流れるので補機バッテリＢ２の充電が行なわれる。
【0054】
ステップＳ５、Ｓ６，Ｓ７のいずれかの処理が終了し、キャパシタ４０の余分なエネルギが放出されキャパシタ４０の電圧ＶＣがメインバッテリＢ１の電圧ＶＢ１と大体等しくなると、ステップＳ８に処理が進む。
【0055】
ステップＳ８では、キャパシタ４０を電源ラインＰＬ２および接地ラインＳＬに接続していたシステムメインリレーＣ－ＳＭＲＰ，Ｃ－ＳＭＲＧが開放され、キャパシタ４０が切離される。そして、ステップＳ９においてメインバッテリＢ１を電源ラインＰＬ１および接地ラインＳＬに接続していたシステムメインリレーＳＭＲ２、ＳＭＲ３が開放され、メインバッテリＢ１が切離され、ステップＳ１０で処理が終了する。
【0056】
図３は、図２のフローチャートに基づいて電源システムの停止処理が行なわれた状況の一例を示す波形図である。
【0057】
図１、図３を参照して、まず時刻ｔ１以前では、昇降圧コンバータ電圧指令が１００Ｖに設定され昇降圧コンバータ１２によってメインバッテリＢ１の電圧が昇圧された結果、キャパシタの電圧ＶＣは、メインバッテリＢ１の電圧ＶＢ１よりも昇圧された４００Ｖとなっている。また、補機バッテリＢ２の電圧ＶＢ２は、１２Ｖであり補機バッテリＢ２はまだ充電可能な状態である。
【0058】
時刻ｔ１において、運転者によって電源システムの停止操作が行なわれて起動信号ＩＧがオン状態からオフ状態に変化すると、上述した状態に電源システムがあるので、図２のフローチャートではステップＳ１→Ｓ２→Ｓ３→Ｓ４→Ｓ５の順に処理が進む。
【0059】
その結果、時刻ｔ２では補機バッテリＢ２に充電された結果、電圧ＶＢ２は１３Ｖに上昇し、応じてＤＣ／ＤＣコンバータ電圧指令値（ＶＢ２指令値）も１３Ｖより少し上に設定されさらに補機バッテリＢ２への充電が続けられる。

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【0060】
時刻ｔ３では補機バッテリＢ２にさらに充電された結果、電圧ＶＢ２は１４Ｖに上昇し、応じてＤＣ／ＤＣコンバータ電圧指令値（ＶＢ２指令値）も１４Ｖより少し上に設定されさらに補機バッテリＢ２への充電が続けられる。
【0061】
時刻ｔ４では補機バッテリＢ２にさらに充電された結果、電圧ＶＢ２は１５Ｖに上昇し、応じてＤＣ／ＤＣコンバータ電圧指令値（ＶＢ２指令値）も１５Ｖより少し上に設定されさらに補機バッテリＢ２への充電が続けられるが、キャパシタ電圧ＶＣがメインバッテリＢ１の電圧ＶＢ１とほぼ等しくなっており、キャパシタの余分なチャージは抜けているので補機バッテリＢ２への充電は停止され、ＩＧＢＴ素子Ｑ９がオフ状態に制御されその後システムメインリレーＣ－ＳＭＲＰ，Ｃ－ＳＭＲＧが開放状態に制御される。
【0062】
なお、充電途中で、補機バッテリＢ２の電圧が上限値に達した場合は、図２のステップＳ６で説明した熱消費によるディスチャージ処理に切換えられる。また、図２のステップＳ３における充電受入れ可能の判断の電圧値や図３の電圧ＶＢ２に示した電圧値は例示であり、補機バッテリＢ２の電圧上限値は電池の種類や性能実力値により異なるので、適宜これらを考慮して定められる。
【0063】
以上説明したように、本実施の形態によれば、熱として消費していたシステム停止時のキャパシタのエネルギを可能な限り回収可能となり、車両のエネルギ効率が改善される。
【0064】
なお、本実施の形態では動力分割機構によりエンジンの動力を車軸と発電機とに分割して伝達可能なシリーズ／パラレル型ハイブリッドシステムに適用した例を示した。しかし本発明は、発電機を駆動するためにのみエンジンを用い、発電機により発電された電力を使うモータでのみ車軸の駆動力を発生させるシリーズ型ハイブリッド自動車や、モータのみで走行する電気自動車にも適用できる。
【0065】
今回開示された実施の形態はすべての点で例示であって制限的なものではないと考えられるべきである。本発明の範囲は上記した説明ではなくて特許請求の範囲によって示され、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれることが意図される。
【図面の簡単な説明】
【0066】
【図１】本発明の実施の形態に係る車両の構成を示す回路図である。
【図２】図１の車両１００で実行される電源システムの停止処理の手順を示したフローチャートである。
【図３】図２のフローチャートに基づいて電源システムの停止処理が行なわれた状況の一例を示す波形図である。
【符号の説明】
【0067】
３　動力分割機構、４　エンジン、１０，１３，２１，４４，５２　電圧センサ、１１，４６　電流センサ、１２　昇降圧コンバータ、１４，１４Ａ　インバータ、１５，１５Ａ　Ｕ相アーム、１６，１６Ａ　Ｖ相アーム、１７，１７Ａ　Ｗ相アーム、３０　制御装置、４０　キャパシタ、４２　電気二重層コンデンサ、４３　フューズ、４５　温度センサ、５０　ＤＣ／ＤＣコンバータ、１００　車両、Ｂ１　メインバッテリ、Ｂ２　補機バッテリ、Ｃ１，Ｃ２　平滑用コンデンサ、Ｄ１～Ｄ９　ダイオード、Ｌ１　リアクトル、ＭＧ１，ＭＧ２　モータジェネレータ、ＰＬ１，ＰＬ２　電源ライン、Ｑ１～Ｑ９　ＩＧＢＴ素子、Ｒ１　制限抵抗、Ｒ２　ディスチャージ用抵抗、Ｃ－ＳＭＲＰ，Ｃ－ＳＭＲＧ，ＳＭＲ１～ＳＭＲ３　システムメインリレー。

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Espacenet

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VOLTAGE CONVERTER AND VEHICLE HAVING SAME

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Abstract of JP2008005625 (A)

PROBLEM TO BE SOLVED: To provide a voltage converter capable of reducing a current ripple from two converters connected in parallel, and to provide a vehicle having the voltage converter. ;SOLUTION: The converters 10, 12 are connected in parallel with each other. The converter 10 boosts voltage from an energy storage device B1 based on a signal PWC 1 from an ECU 30 for outputting to a capacitor C. The converter 12 boosts voltage from an energy storage device B2 based on a signal PWC 2 from the ECU 30 for outputting to the capacitor C. The ECU 30 uses a carrier signal, where the frequency is the same and the phase is asynchronized, for generating the signals PWC 1, PWC 2; and outputs the generated signals PWC 1, PWC 2 to the converters 10, 12, respectively. ;COPYRIGHT: (C)2008,JPO&INPIT

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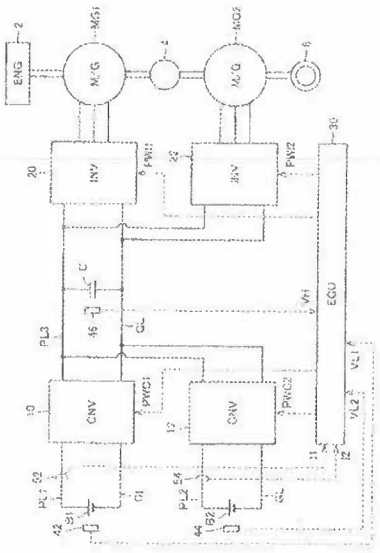
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(54)【発明の名称】電圧変換装置およびそれを備えた車両

(57)【要約】
【課題】並列接続された２つのコンバータからの電流リップルを低減可能な電圧変換装置およびそれを備えた車両を提供する。
【解決手段】コンバータ１０，１２は、互いに並列に接続される。コンバータ１０は、ＥＣＵ３０からの信号ＰＷＣ１に基づき蓄電装置Ｂ１からの電圧を昇圧してコンデンサＣへ出力する。コンバータ１２は、ＥＣＵ３０からの信号ＰＷＣ２に基づき蓄電装置Ｂ２からの電圧を昇圧してコンデンサＣへ出力する。ＥＣＵ３０は、同じ周波数を有し、かつ、位相が非同期化されたキャリア信号を用いて信号ＰＷＣ１，ＰＷＣ２を生成し、その生成した信号ＰＷＣ１，ＰＷＣ２をコンバータ１０，１２へそれぞれ出力する。
【選択図】図１



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【特許請求の範囲】
【請求項1】
第１の蓄電装置からの電圧を変換してコンデンサへ出力する第１のコンバータと、
前記第１のコンバータに並列に接続され、第２の蓄電装置からの電圧を変換して前記コンデンサへ出力する第２のコンバータと、
同じ周波数を有し、かつ、位相が非同期化された第１および第２の搬送波を用いて第１および第２の駆動信号をそれぞれ生成し、その生成した第１および第２の駆動信号を前記第１および第２のコンバータへそれぞれ出力する制御装置とを備える電圧変換装置。
【請求項2】
前記第２の搬送波の位相は、前記第１の搬送波の位相と略１８０度異なる、請求項１に記載の電圧変換装置。
【請求項3】
前記制御装置は、
前記第１の搬送波を発生する搬送波発生部と、
前記第１のコンバータに対する第１の変調波と前記第１の搬送波とに基づいて前記第１の駆動信号を生成する第１の信号生成部と、
前記第１の搬送波の位相を反転した前記第２の搬送波を生成する位相反転部と、
前記第２のコンバータに対する第２の変調波と前記第２の搬送波とに基づいて前記第２の駆動信号を生成する第２の信号生成部とを含む、請求項２に記載の電圧変換装置。
【請求項4】
前記第２の搬送波の位相は、前記第２の駆動信号の立上りタイミングが前記第１の駆動信号の立下りタイミングと同期するように調整される、請求項１に記載の電圧変換装置。
【請求項5】
前記制御装置は、
前記第１の搬送波を発生する搬送波発生部と、
前記第１のコンバータに対する第１の変調波と前記第１の搬送波とに基づいて前記第１の駆動信号を生成する第１の信号生成部と、
前記第１の駆動信号に基づいて、前記第２の駆動信号の立上りタイミングが前記第１の駆動信号の立下りタイミングと同期するように前記第１の搬送波に対して位相が調整された前記第２の搬送波を生成する位相調整部と、
前記第２のコンバータに対する第２の変調波と前記第２の搬送波とに基づいて前記第２の駆動信号を生成する第２の信号生成部とを含む、請求項４に記載の電圧変換装置。
【請求項6】
前記第１および第２のコンバータの各々は、チョッパ回路を含む、請求項１から請求項５のいずれか１項に記載の電圧変換装置。
【請求項7】
請求項１から請求項６のいずれか１項に記載の電圧変換装置と、
前記電圧変換装置に含まれるコンデンサから電圧を受ける駆動装置と、
前記駆動装置によって駆動される電動機と、
前記電動機の出力軸に連結される駆動輪とを備える車両。

【発明の詳細な説明】
【技術分野】
【0001】
この発明は、電圧変換装置およびそれを備えた車両に関し、特に、並列接続された２つのコンバータを含む電圧変換装置およびそれを備えた車両に関する。
【背景技術】
【0002】
特開２００３－１９９２０３号公報（特許文献１）は、直流源とインバータとの間にＤＣ／ＤＣコンバータを介してエネルギー蓄積手段が接続された電気回路を開示する。この電気回路は、モータ負荷を駆動するインバータと、インバータの直流入力電圧の瞬時リッ

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プルを抑制する平滑コンデンサと、インバータに直流電圧を供給する直流源と、直流源に並列に接続されるＤＣ／ＤＣコンバータと、ＤＣ／ＤＣコンバータに接続される回生エネルギー蓄積手段とを備える。

【０００３】

この電気回路においては、インバータの直流入力電圧が検出され、検出電圧が設定レベルを超えると、回生エネルギー蓄積手段への充電電流を増加させる方向にＤＣ／ＤＣコンバータの通流率を変化させる。これにより、インバータ、ＤＣ／ＤＣコンバータおよび回生エネルギー蓄積手段が保護される（特許文献１参照）。

【特許文献1】特開２００３－１９９２０３号公報

【特許文献2】特開２００４－１７３３４０号公報

【特許文献3】特開２００１－５４２１０号公報

【発明の開示】

【発明が解決しようとする課題】

【０００４】

特開２００３－１９９２０３号公報に開示される電気回路では、直流源およびＤＣ／ＤＣコンバータが並列に接続され、ＤＣ／ＤＣコンバークに回生エネルギー蓄積手段が接続される。すなわち、インバータの直流入力に２つの直流電源が並列に接続される。

【０００５】

しかしながら、上記公報では、モータ負荷からの回生エネルギーが過多となったときの回路保護技術が開示されているにすぎず、並列接続された２つの直流電源を併用してインバータへ電力を供給することは想定されていない。すなわち、上記公報に開示される電気回路では、直流源が途絶えたとき、あるいはその電圧が低下したとき、直流源に代えて回生エネルギー蓄積手段が用いられる。

【０００６】

一方、並列接続された２つの直流電源を併用してインバータへ電力を供給する場合、安定した電圧を供給するには、各直流電源に対応してコンバータを設ける必要がある。しかしながら、２つのコンバータが並設される場合、２つのコンバータから出力されるトータル電流のリップルがインバータ入力側に設けられた平滑コンデンサに与える影響に配慮する必要がある。

【０００７】

そこで、この発明は、かかる課題を解決するためになされたものであり、その目的は、２つのコンバータが並列接続される場合の電流リップルを低減可能な電圧変換装置を提供することである。

【０００８】

また、この発明の別の目的は、２つのコンバータが並列接続される場合の電流リップルを低減可能な電圧変換装置を備えた車両を提供することである。

【課題を解決するための手段】

【０００９】

この発明によれば、電圧変換装置は、第１および第２のコンバータと、第１および第２の駆動信号を生成して第１および第２のコンバータへそれぞれ出力する制御装置とを備える。第１のコンバータは、第１の蓄電装置からの電圧を変換してコンデンサへ出力する。第２のコンバータは、第１のコンバータに並列に接続され、第２の蓄電装置からの電圧を変換してコンデンサへ出力する。制御装置は、同じ周波数を有し、かつ、位相が非同期化された第１および第２の搬送波（キャリア）を用いて第１および第２の駆動信号をそれぞれ生成する。

【００１０】

好ましくは、第２の搬送波の位相は、第１の搬送波の位相と略１８０度異なる。

さらに好ましくは、制御装置は、第１の搬送波を発生する搬送波発生部と、第１のコンバータに対する第１の変調波と第１の搬送波とに基づいて第１の駆動信号を生成する第１の信号生成部と、第１の搬送波の位相を反転した第２の搬送波を生成する位相反転部と、

第２のコンバータに対する第２の変調波と第２の搬送波とに基づいて第２の駆動信号を生成する第２の信号生成部とを含む。

【0011】

また、好ましくは、第２の搬送波の位相は、第２の駆動信号の立上りタイミングが第１の駆動信号の立下りタイミングと同期するように調整される。

【0012】

さらに好ましくは、制御装置は、第１の搬送波を発生する搬送波発生部と、第１のコンバータに対する第１の変調波と第１の搬送波とに基づいて第１の駆動信号を生成する第１の信号生成部と、第１の駆動信号に基づいて、第２の駆動信号の立上りタイミングが第１の駆動信号の立下りタイミングと同期するように第１の搬送波に対して位相が調整された第２の搬送波を生成する位相調整部と、第２のコンバータに対する第２の変調波と第２の搬送波とに基づいて第２の駆動信号を生成する第２の信号生成部とを含む。

【0013】

好ましくは、第１および第２のコンバータの各々は、チョッパ回路を含む。

また、この発明によれば、車両は、上述したいずれかの電圧変換装置と、電圧変換装置に含まれるコンデンサから電圧を受ける駆動装置と、駆動装置によって駆動される電動機と、電動機の出力軸に連結される駆動輪とを備える。

【発明の効果】

【0014】

この発明においては、第１および第２のコンバータは、互いに並列に接続され、対応する蓄電装置からの電圧を変換してコンデンサへ出力する。そして、制御装置は、同じ周波数を有し、かつ、位相が非同期化された第１および第２の搬送波を用いて第１および第２の駆動信号をそれぞれ生成するので、第１のコンバータの出力電流のリップル（第１の電流リップル）に対して第２のコンバータの出力電流のリップル（第２の電流リップル）の位相がずれる。これにより、第１および第２の電流リップルのピークが非同期化され、第１および第２のコンバータからコンデンサに流れ込むトータル電流のリップルのピークが抑制される。

【0015】

したがって、この発明によれば、コンデンサの長寿命化を図ることができる。また、コンデンサに要求される容量（サイズ）を適正化することができる。

【発明を実施するための最良の形態】

【0016】

以下、本発明の実施の形態について、図面を参照しながら詳細に説明する。なお、図中同一または相当部分には同一符号を付してその説明は繰返さない。

【0017】

［実施の形態１］

図１は、この発明による車両の一例として示されるハイブリッド車両の全体ブロック図である。図１を参照して、このハイブリッド車両１００は、エンジン２と、モータジェネレータＭＧ１，ＭＧ２と、動力分割機構４と、車輪６とを備える。また、ハイブリッド車両１００は、蓄電装置Ｂ１，Ｂ２と、コンバータ１０，１２と、コンデンサＣと、インバータ２０，２２と、ＥＣＵ（Electronic Control Unit）３０と、電圧センサ４２，４４，４６と、電流センサ５２，５４とをさらに備える。

【0018】

このハイブリッド車両１００は、エンジン２およびモータジェネレータＭＧ２を動力源として走行する。動力分割機構４は、エンジン２とモータジェネレータＭＧ１，ＭＧ２とに結合されてこれらの間で動力を分配する。動力分割機構４は、たとえば、サンギヤ、プラネタリキャリヤおよびリングギヤの３つの回転軸を有する遊星歯車機構から成り、この３つの回転軸がエンジン４およびモータジェネレータＭＧ１，ＭＧ２の回転軸にそれぞれ接続される。なお、モータジェネレータＭＧ１のロータを中空にしてその中心にエンジン２のクランク軸を通すことにより、動力分割機構４にエンジン２およびモータジェネレー

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タＭＧ１，ＭＧ２を機械的に接続することができる。また、モータジェネレータＭＧ２の回転軸は、図示されない減速ギヤや作動ギヤによって車輪６に結合される。

【００１９】

そして、モータジェネレータＭＧ１は、エンジン２によって駆動される発電機として動作し、かつ、エンジン２の始動を行ない得る電動機として動作するものとしてハイブリッド車両１００に組込まれ、モータジェネレータＭＧ２は、車輪６を駆動する電動機としてハイブリッド車両１００に組込まれる。

【００２０】

蓄電装置Ｂ１，Ｂ２は、充放電可能な直流電源であり、たとえば、ニッケル水素やリチウムイオン等の二次電池から成る。蓄電装置Ｂ１は、コンバータ１０へ電力を供給し、また、電力回生時には、コンバータ１０によって充電される。蓄電装置Ｂ２は、コンバータ１２へ電力を供給し、また、電力回生時には、コンバータ１２によって充電される。

【００２１】

なお、たとえば、蓄電装置Ｂ１には、蓄電装置Ｂ２よりも出力可能最大電力が大きい二次電池を用いることができ、蓄電装置Ｂ２には、蓄電装置Ｂ１よりも蓄電容量が大きい二次電池を用いることができる。これにより、２つの蓄電装置Ｂ１，Ｂ２を用いてハイパワーかつ大容量の直流電源を構成することができる。なお、蓄電装置Ｂ１，Ｂ２として、大容量のキャパシタを用いてもよい。

【００２２】

コンバータ１０は、ＥＣＵ３０からの信号ＰＷＣ１に基づいて蓄電装置Ｂ１からの電圧を昇圧し、その昇圧した電圧を電源ラインＰＬ３へ出力する。また、コンバータ１０は、インバータ２０，２２から電源ラインＰＬ３を介して供給される回生電力を信号ＰＷＣ１に基づいて蓄電装置Ｂ１の電圧レベルに降圧し、蓄電装置Ｂ１を充電する。

【００２３】

コンバータ１２は、電源ラインＰＬ３および接地ラインＧＬにコンバータ１０に並列に接続される。そして、コンバータ１２は、ＥＣＵ３０からの信号ＰＷＣ２に基づいて蓄電装置Ｂ２からの電圧を昇圧し、その昇圧した電圧を電源ラインＰＬ３へ出力する。また、コンバータ１２は、インバータ２０，２２から電源ラインＰＬ３を介して供給される回生電力を信号ＰＷＣ２に基づいて蓄電装置Ｂ２の電圧レベルに降圧し、蓄電装置Ｂ２を充電する。

【００２４】

コンデンサＣは、電源ラインＰＬ３と接地ラインＧＬとの間に接続され、電源ラインＰＬ３と接地ラインＧＬとの間の電圧変動を平滑化する。

【００２５】

インバータ２０は、ＥＣＵ３０からの信号ＰＷＩ１に基づいて電源ラインＰＬ３からの直流電圧を３相交流電圧に変換し、その変換した３相交流電圧をモータジェネレータＭＧ１へ出力する。また、インバータ２０は、エンジン２の動力を用いてモータジェネレータＭＧ１が発電した３相交流電圧を信号ＰＷＩ１に基づいて直流電圧に変換し、その変換した直流電圧を電源ラインＰＬ３へ出力する。

【００２６】

インバータ２２は、ＥＣＵ３０からの信号ＰＷＩ２に基づいて電源ラインＰＬ３からの直流電圧を３相交流電圧に変換し、その変換した３相交流電圧をモータジェネレータＭＧ２へ出力する。また、インバータ２２は、車両の回生制動時、車輪６からの回転力を受けてモータジェネレータＭＧ２が発電した３相交流電圧を信号ＰＷＩ２に基づいて直流電圧に変換し、その変換した直流電圧を電源ラインＰＬ３へ出力する。

【００２７】

モータジェネレータＭＧ１，ＭＧ２の各々は、３相交流回転電機であり、たとえば３相交流同期電動発電機から成る。モータジェネレータＭＧ１は、インバータ２０によって回生駆動され、エンジン２の動力を用いて発電した３相交流電圧をインバータ２０へ出力する。また、モータジェネレータＭＧ１は、エンジン２の始動時、インバータ２０によって

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力行駆動され、エンジン２をクランキングする。モータジェネレータＭＧ２は、インバータ２２によって力行駆動され、車輪６を駆動するための駆動力を発生する。また、モータジェネレータＭＧ２は、車両の回生制動時、インバータ２２によって回生駆動され、車輪６から受ける回転力を用いて発電した３相交流電圧をインバータ２２へ出力する。

【0028】

電圧センサ４２は、蓄電装置Ｂ１の電圧ＶＬ１を検出してＥＣＵ３０へ出力する。電流センサ５２は、蓄電装置Ｂ１からコンデンサ１０へ出力される電流Ｉ１を検出してＥＣＵ３０へ出力する。電圧センサ４４は、蓄電装置Ｂ２の電圧ＶＬ２を検出してＥＣＵ３０へ出力する。電流センサ５４は、蓄電装置Ｂ２からコンデンサ１２へ出力される電流Ｉ２を検出してＥＣＵ３０へ出力する。電圧センサ４６は、コンデンサＣの端子間電圧、すなわち接地ラインＧＬに対する電源ラインＰＬ３の電圧ＶＨを検出し、その検出した電圧ＶＨをＥＣＵ３０へ出力する。

【0029】

ＥＣＵ３０は、コンバータ１０，１２をそれぞれ駆動するための信号ＰＷＣ１，ＰＷＣ２を生成し、その生成した信号ＰＷＣ１，ＰＷＣ２をそれぞれコンバータ１０，１２へ出力する。また、ＥＣＵ３０は、インバータ２０、２２をそれぞれ駆動するための信号ＰＷＩ１，ＰＷＩ２を生成し、その生成した信号ＰＷＩ１，ＰＷＩ２をそれぞれインバータ２０，２２へ出力する。

【0030】

図２は、図１に示したコンバータ１０，１２の構成を示す回路図である。図２を参照して、コンバータ１０（１２）は、ｎｐｎ型トランジスタＱ１，Ｑ２と、ダイオードＤ１，Ｄ２と、リアクトルＬとを含む。ｎｐｎ型トランジスタＱ１，Ｑ２は、電源ラインＰＬ３と接地ラインＧＬとの間に直列に接続される。ダイオードＤ１，Ｄ２は、それぞれｎｐｎ型トランジスタＱ１，Ｑ２に逆並列に接続される。リアクトルＬの一方端は、ｎｐｎ型トランジスタＱ１，Ｑ２の接続ノードに接続され、その他方端は、電源ラインＰＬ１（ＰＬ２）に接続される。なお、上記のｎｐｎ型トランジスタとして、たとえばＩＧＢＴ（Insulated Gate Bipolar Transister）を用いることができる。

【0031】

このコンバータ１０（１２）は、チョッパ回路から成る。そして、コンバータ１０（１２）は、ＥＣＵ３０（図示せず）からの信号ＰＷＣ１（ＰＷＣ２）に基づいて、電源ラインＰＬ１（ＰＬ２）の電圧をリアクトルＬを用いて昇圧し、その昇圧した電圧を電源ラインＰＬ３へ出力する。

【0032】

具体的には、コンバータ１０（１２）は、ｎｐｎ型トランジスタＱ２のオン時に流れる電流をリアクトルＬに磁場エネルギーとして蓄積することによって電源ラインＰＬ１（ＰＬ２）の電圧を昇圧する。そして、コンバータ１０（１２）は、その昇圧した電圧をｎｐｎ型トランジスタＱ２がオフされたタイミングに同期してダイオードＤ１を介して電源ラインＰＬ３へ出力する。

【0033】

図３は、図１に示したＥＣＵ３０の機能ブロック図である。図３を参照して、ＥＣＵ３０は、コンバータ制御部３２と、インバータ制御部３４，３６とを含む。

【0034】

コンバータ制御部３２は、電圧センサ４２からの電圧ＶＬ１、電圧センサ４６からの電圧ＶＨ、および電流センサ５２からの電流Ｉ１に基づいて、コンバータ１０のｎｐｎ型トランジスタＱ１，Ｑ２をオン／オフするためのＰＷＭ（Pulse Width Modulation）信号を生成し、その生成したＰＷＭ信号を信号ＰＷＣ１としてコンバータ１０へ出力する。

【0035】

また、コンバータ制御部３２は、電圧センサ４４からの電圧ＶＬ２、電圧ＶＨ、および電流センサ５４からの電流Ｉ２に基づいて、コンバータ１２のｎｐｎ型トランジスタＱ１，Ｑ２をオン／オフするためのＰＷＭ信号を生成し、その生成したＰＷＭ信号を信号ＰＷ

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ＣＲＴ１およびロータ回転角θ１、ならびに電圧ＶＨに基づいて、インバータ２０に含まれるパワートランジスタをオン／オフするためのＰＷＭ信号を生成し、その生成したＰＷＭ信号を信号ＰＷＩ１としてインバータ２０へ出力する。

【００３７】

インバータ制御部３６は、モータジェネレータＭＧ２のトルク指令ＴＲ２、モータ電流ＭＣＲＴ２およびロータ回転角θ２、ならびに電圧ＶＨに基づいて、インバータ２２に含まれるパワートランジスタをオン／オフするためのＰＷＭ信号を生成し、その生成したＰＷＭ信号を信号ＰＷＩ２としてインバータ２２へ出力する。

【００３８】

なお、トルク指令ＴＲ１，ＴＲ２は、たとえば、アクセル開度やブレーキ踏込量、車両速度などに基づいて、図示されない外部ＥＣＵによって算出される。また、モータ電流ＭＣＲＴ１，ＭＣＲＴ２およびロータ回転角θ１，θ２の各々は、図示されないセンサによって検出される。

【００３９】

図４は、図３に示したコンバータ制御部３２の機能ブロック図である。図４を参照して、コンバータ制御部３２は、変調波生成部１０２，１０４と、キャリア発生部１０６と、位相反転部１０８と、コンパレータ１１０，１１２とを含む。

【００４０】

変調波生成部１０２は、電圧ＶＬ１，ＶＨおよび／または電流Ｉ１に基づいて、コンバータ１０に対応する変調波Ｍ１を生成する。変調波生成部１０４は、電圧ＶＬ２，ＶＨおよび／または電流Ｉ２に基づいて、コンバータ１２に対応する変調波Ｍ２を生成する。なお、変調波生成部１０２，１０４は、対応するコンバータの入力電流や出力電圧を目標値に制御するように変調波Ｍ１，Ｍ２を生成することができる。たとえば、変調波生成部１０２は、蓄電装置Ｂ１からコンバータ１０に供給される電流Ｉ１が所定の目標値に制御されるように電流Ｉ１に基づいて変調波を生成し、変調波生成部１０４は、電圧ＶＨが所定の目標値に制御されるように電圧ＶＬ２，ＶＨに基づいて変調波Ｍ２を生成することができる。

【００４１】

キャリア発生部１０６は、ＰＷＭ信号である信号ＰＷＣ１を生成するためのキャリア信号ＦＣ１を発生する。キャリア信号ＦＣ１は、三角波から成り、その周期は、コンバータ１０，１２のスイッチング損失を考慮して設定される。

【００４２】

位相反転部１０８は、キャリア発生部１０６からのキャリア信号ＦＣ１を受け、キャリア信号ＦＣ１に対して位相を１８０度シフトしたキャリア信号ＦＣ２を出力する。

【００４３】

コンパレータ１１０は、変調波生成部１０２からの変調波Ｍ１をキャリア発生部１０６からのキャリア信号ＦＣ１と比較し、その大小関係に応じて変化する信号ＰＷＣ１を生成する。コンパレータ１１２は、変調波生成部１０４からの変調波Ｍ２を位相反転部１０８からのキャリア信号ＦＣ２と比較し、その大小関係に応じて変化する信号ＰＷＣ２を生成する。

【００４４】

このコンバータ制御部３２においては、信号ＰＷＣ１は、キャリア信号ＦＣ１に基づいて生成され、信号ＰＷＣ２は、キャリア信号ＦＣ１に対して位相を１８０度シフトしたキャリア信号ＦＣ２に基づいて生成される。これにより、コンバータ１０の出力電流のリップルに対してコンバータ１２の出力電流のリップルの位相が１８０度ずれる。

【００４５】

図５は、コンバータ１０，１２の出力電流の波形図である。また、図６は、仮に同位相

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のキャリア信号を用いてコンバータ１０，１２を制御した場合のコンバータ１０，１２の出力電流の波形図である。なお、図６は、この発明の効果を示すために比較として示されるものである。

【0046】

図５，図６を参照して、電流ＩＨ１，ＩＨ２は、それぞれコンバータ１０，１２の出力電流を示す。電流ＩＨＴは、電流ＩＨ１，ＩＨ２の合計値、すなわち、２台のコンバータ１０，１２からコンデンサＣへ供給されるトータル電流を示す。

【0047】

図６に示されるように、同位相のキャリア信号を用いてコンバータ１０，１２を制御した場合、電流ＩＨ１のピークと電流ＩＨ２のピークとが重なり、トータル電流ＩＨＴのリップルは増大する。

【0048】

一方、この実施の形態１においては、上述のように、互いに位相が１８０度シフトされたキャリア信号を用いてコンバータ１０，１２が制御されるので、図５に示されるように、電流ＩＨ１のピークと電流ＩＨ２のピークとが位相にして１８０度ずれており、その結果、トータル電流ＩＨＴのリップルは図６の場合に比べて抑制される。

【0049】

なお、コンバータ１０，１２の昇圧比が低い場合、電流ＩＨ１，ＩＨ２が重なる部分が生じ得るけれども、この場合は、電流の絶対値が小さいものと想定されるので、問題にはならない。

【0050】

なお、コンバータ１０，１２においては、ｎｐｎ型トランジスタＱ１，Ｑ２のスイッチング動作に応じてリアクトルＬが振動し、キャリア周波数に依存した電磁騒音が発生する。しかしながら、上述のように、互いに位相が１８０度シフトされたキャリア信号を用いてコンバータ１０，１２を制御すると、コンバータ１０，１２全体からの騒音を低減し得る。

【0051】

図７は、コンバータ１０，１２からの電磁騒音が伝播する様子を模式的に示した図である。図７を参照して、コンバータ１０，１２からの音波Ｗ１，Ｗ２が車内の乗員１２０へ伝播する場合、コンバータ１０，１２間の距離は、コンバータ１０，１２と乗員１２０との距離に比べて近いので、乗員１２０に対してコンバータ１０，１２は１つの音源１２２とみなすことができる。

【0052】

ここで、コンバータ１０，１２は、互いに位相が１８０度シフトされたキャリア信号を用いて制御されるので、音波Ｗ１，Ｗ２の位相差が１８０度となり、乗員１２０の位置において音波Ｗ１，Ｗ２は互いに打消し合う。したがって、コンバータ１０，１２全体からの騒音を低減し得る。

【0053】

以上のように、この実施の形態１においては、キャリア信号ＦＣ１に対して位相を１８０度シフトしたキャリア信号ＦＣ２が生成され、キャリア信号ＦＣ１，ＦＣ２を用いてそれぞれ信号ＰＷＣ１，ＰＷＣ２が生成されるので、コンバータ１０の出力電流のリップルに対してコンバータ１２の出力電流のリップルの位相が１８０度ずれる。これにより、各コンバータ１０，１２の出力電流のリップルのピークがずらされ、コンバータ１０，１２からコンデンサＣに流れ込むトータル電流ＩＨＴのリップルのピークが抑制される。

【0054】

したがって、この実施の形態１によれば、コンデンサＣの長寿命化を図ることができる。また、コンデンサＣに要求される容量（サイズ）を低減することができる。

【0055】

さらに、コンバータ１０，１２から発生する音波Ｗ１，Ｗ２の位相も反転されるので、コンバータ１０，１２全体からの騒音を低減することができる。

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【0056】
［実施の形態２］
実施の形態１では、コンバータ１０用のキャリア信号ＦＣ１に対してコンバータ１２用のキャリア信号ＦＣ２の位相を１８０度シフトしたが、キャリア信号ＦＣ１，ＦＣ２の位相差は、必ずしも１８０度である必要はない。
【0057】
図８は、実施の形態２におけるコンバータ制御部の機能ブロック図である。図８を参照して、このコンバータ制御部３２Ａは、図４に示した実施の形態１におけるコンバータ制御部３２の構成において、位相反転部１０８に代えて位相調整部１１４を含む。
位相調整部１１４は、キャリア発生部１０６からのキャリア信号ＦＣ１と、コンパレータ１１０，１１２からそれぞれ出力される信号ＰＷＣ１，ＰＷＣ２とを受ける。そして、位相調整部１１４は、信号ＰＷＣ２の立上りタイミングが信号ＰＷＣ１の立下りタイミングに同期するようにキャリア信号ＦＣ１に対して位相調整されたキャリア信号ＦＣ２を出力する。
【0058】
なお、コンバータ制御部３２Ａのその他の構成は、コンバータ制御部３２と同じである。
【0059】
このコンバータ制御部３２Ａにおいては、信号ＰＷＣ２の立上りタイミングが信号ＰＷＣ１の立下りタイミングに同期するように、キャリア信号ＦＣ１に対してキャリア信号ＦＣ２の位相が調整される。これにより、コンバータ１０の出力電流のリップルに対してコンバータ１２の出力電流のリップルの位相がずれるとともに、コンバータ１０からのリップル電流とコンバータ１２からのリップル電流とが一部連続的になる。
【0060】
図９は、実施の形態２におけるコンバータ１０，１２の出力電流の波形図である。図９を参照して、電流ＩＨ１，ＩＨ２は、それぞれコンバータ１０，１２の出力電流を示す。電流ＩＨＴは、電流ＩＨ１，ＩＨ２の合計値、すなわち、２台のコンバータ１０，１２からコンデンサＣへ供給されるトータル電流を示す。
【0061】
上述のように、信号ＰＷＣ２の立上りタイミングを信号ＰＷＣ１の立下りタイミングに同期させることにより、電流ＩＨ２の立上りタイミングが電流ＩＨ１の立下りタイミングに同期する。したがって、電流ＩＨ１が流された後に連続して電流ＩＨ２が流され、その結果、トータル電流ＩＨＴのリップル周波数は、図５に示した実施の形態１の場合に比べて半減する。
【0062】
なお、上記においては、信号ＰＷＣ２の立上りタイミングが信号ＰＷＣ１の立下りタイミングに同期するようにキャリア信号ＦＣ１，ＦＣ２の位相差を調整したが、信号ＰＷＣ１の立上りタイミングが信号ＰＷＣ２の立下りタイミングに同期するようにキャリア信号ＦＣ１，ＦＣ２の位相差を調整してもよい。
【0063】
以上のように、この実施の形態２においては、信号ＰＷＣ１の立下りタイミングに信号ＰＷＣ２の立上りタイミングが同期するようにキャリア信号ＦＣ１，ＦＣ２の位相差が調整されるので、コンバータ１０からの電流ＩＨ１およびコンバータ１２からの電流ＩＨ２が一部連続化される。これにより、トータル電流ＩＨＴのリップル周波数は、実施の形態１に比べて半減する。
【0064】
したがって、この実施の形態２によれば、コンバータ１０，１２によるコンデンサＣへのリップルの影響を実施の形態１に比べてさらに低減することができる。
【0065】
なお、上記の実施の形態１，２においては、動力分割機構４を用いてエンジン２の動力

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がモータジェネレータＭＧ１と車輪６とに分配される、いわゆるシリーズ／パラレル型のハイブリッド車両について説明したが、エンジン２の動力をモータジェネレータＭＧ１による発電のみに用い、モータジェネレータＭＧ２のみを用いて車両の駆動力を発生する、いわゆるシリーズ型のハイブリッド車両にも、この発明は適用可能である。

【0066】

また、この発明は、エンジン２を備えずに電力のみで走行する電気自動車や、電源として燃料電池をさらに備える燃料電池車にも適用可能である。

【0067】

なお、上記において、コンバータ１０，１２は、それぞれこの発明における「第１のコンバータ」および「第２のコンバータ」に対応し、蓄電装置Ｂ１，Ｂ２は、それぞれこの発明における「第１の蓄電装置」および「第２の蓄電装置」に対応する。また、ＥＣＵ３０は、この発明における「制御装置」に対応し、キャリア発生部１０６は、この発明における「搬送波発生部」に対応する。さらに、コンパレータ１１０，１１２は、それぞれこの発明における「第１の信号生成部」および「第２の信号生成部」に対応する。また、さらに、インバータ２０，２２は、この発明における「駆動装置」を形成し、モータジェネレータＭＧ１，ＭＧ２は、この発明における「電動機」に対応する。

【0068】

今回開示された実施の形態は、すべての点で例示であって制限的なものではないと考えられるべきである。本発明の範囲は、上記した実施の形態の説明ではなくて特許請求の範囲によって示され、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれることが意図される。

【図面の簡単な説明】

【0069】

【図１】この発明による車両の一例として示されるハイブリッド車両の全体ブロック図である。

【図２】図１に示すコンバータの構成を示す回路図である。

【図３】図１に示すＥＣＵの機能ブロック図である。

【図４】図３に示すコンバータ制御部の機能ブロック図である。

【図５】コンバータの出力電流の波形図である。

【図６】仮に同位相のキャリア信号を用いてコンバータを制御した場合のコンバータの出力電流の波形図である。

【図７】コンバータからの電磁騒音が伝播する様子を模式的に示した図である。

【図８】実施の形態２におけるコンバータ制御部の機能ブロック図である。

【図９】実施の形態２におけるコンバータの出力電流の波形図である。

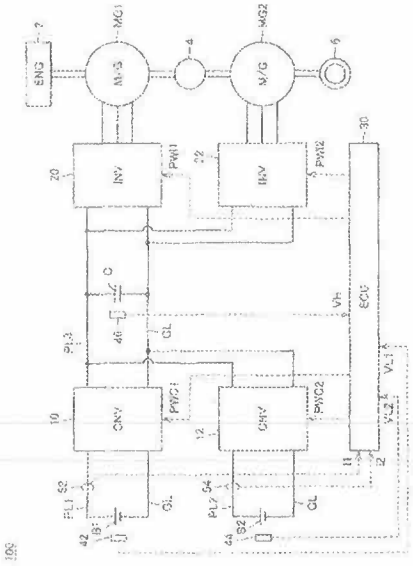
【符号の説明】

【0070】

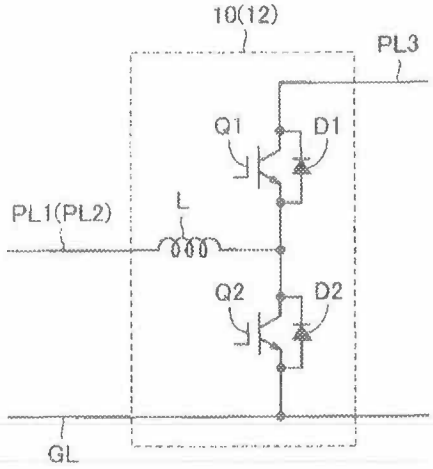
２　エンジン、４　動力分割機構、６　車輪、１０，１２　コンバータ、２０，２２　インバータ、３０　ＥＣＵ、３２，３２Ａ　コンバータ制御部、３４，３６　インバータ制御部、４２，４４，４６　電圧センサ、５２，５４　電流センサ、１００　ハイブリッド車両、１０２，１０４　変調波生成部、１０６　キャリア発生部、１０８　位相反転部、１１０，１１２　コンパレータ、１１４　位相調整部、Ｂ１，Ｂ２　蓄電装置、Ｃ　コンデンサ、ＭＧ１，ＭＧ２　モータジェネレータ、ＰＬ１～ＰＬ３　電源ライン、ＧＬ　接地ライン、Ｑ１，Ｑ２　ｎｐｎ型トランジスタ、Ｄ１，Ｄ２　ダイオード、Ｌ　リアクトル。

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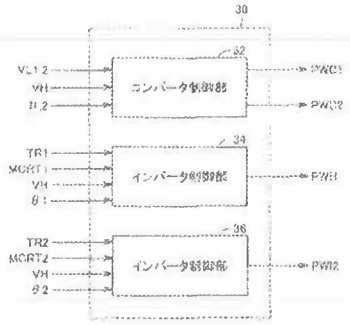
【図1】



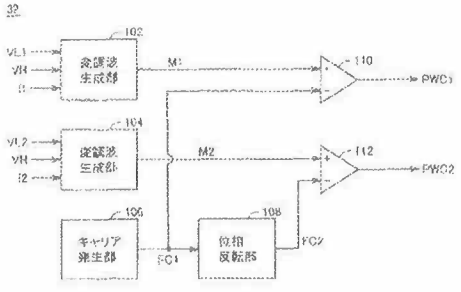
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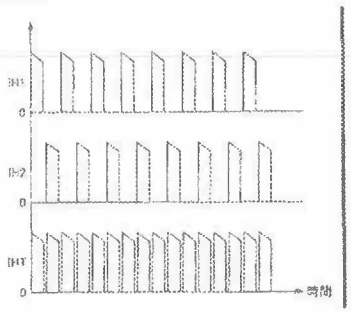
【図3】



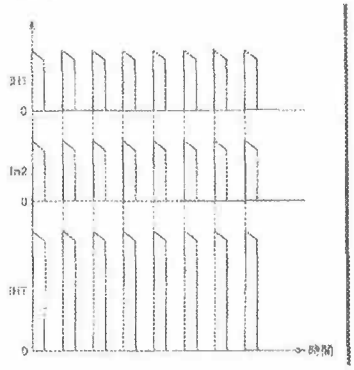
【図4】



【図5】

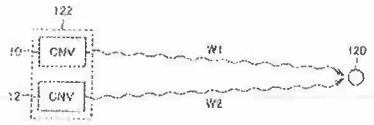


【図6】

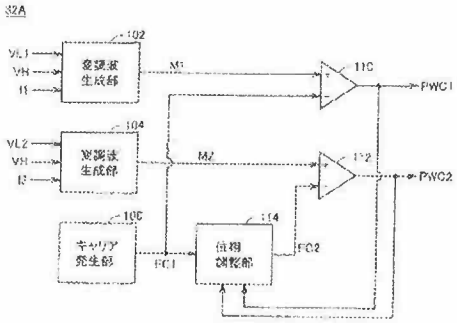


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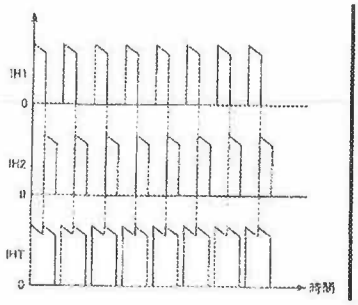
【図7】



【図8】



【図9】



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Fターム(参考)	5H115	PC06	PG04	PI16	PI29	PU10	PU24	PU26	PU28	PU29	PV03
		PV09	PV23	RB22	TI05	TI06					
	5H730	AA14	AA15	AA16	AS01	AS04	AS08	AS13	BB13	BB14	BB57
		BB82	BB89	DD02	DD17	DD32	EE13	EE19	FD01	FD41	FF09
		FG05	FG15								

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Espacenet

Bibliographic data: JP2008312380 (A) — 2008-12-25

CHARGER DEVICE AND CHARGING SYSTEM

Inventor(s): OTAKE SHINICHI ± (OTAKE SHINICHI)

Applicant(s): TOYOTA MOTOR CORP ± (TOYOTA MOTOR CORP)

Classification: - international: ***B60L11/18; B60L3/04; H01M10/44; H02H3/16; H02J7/00***

- cooperative: **B60L15/007**; **B60L15/2009**; **B60L3/0069**; **B60L3/04**; **B60L50/16**; **B60L50/61**; **B60L53/14**; **B60L53/22**; **B60L53/24**; **B60L53/30**; **B60L58/21**; **B60L7/14**; **G01R31/025**; **H01M10/441**; B60L2210/14; B60L2210/40; B60L2220/14; B60L2220/54; B60L2220/56; B60L2240/423; B60L2240/527; B60L2240/529; B60L2240/547; B60L2240/549; G01R31/007; Y02T10/6217; Y02T10/641; Y02T10/645; Y02T10/7005; Y02T10/7061; Y02T10/7072; Y02T10/7077; Y02T10/7225; Y02T10/7241; Y02T10/7275; Y02T90/121; Y02T90/127; Y02T90/14

Application number: JP20070158723 20070615 Global Dossier

Priority number(s): JP20070158723 20070615

Also published as: CN101682203 (A) CN101682203 (B) EP2159898 (A1) EP2159898 (A4) EP2159898 (B1) more

Abstract of JP2008312380 (A)

PROBLEM TO BE SOLVED: To provide a charger device which can smoothly charge an electrical device and to provide a charging system having the charger device. ;SOLUTION: A test circuit 260 inspects an operation of a leakage detecting circuit 240 after inspecting that a relay part 210 is normal. Even if leakage occurs in a feeding route comprising power supply lines PL11, PL12, PL21 and PL22, the possibility that the relay part 210 can interrupt the feeding route can be improved. When contact point welding in the relay part 210 is detected before charging an electricity accumulating unit contained in the electrical device 100 is started, a controller 60 does not charge the

electricity accumulating unit (connection circuit 44 is left in off state as it is). Thus, occurrence of abnormality in the electrical device 100 can be prevented. ;COPYRIGHT: (C)2009,JPO&INPIT

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(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2008-312380
(P2008-312380A)
(43)公開日　平成20年12月25日(2008.12.25)

(51)Int.Cl.			F I			テーマコード（参考）
H02J	7/00	(2006.01)	H02J	7/00	301C	5G004
H01M	10/44	(2006.01)	H02J	7/00	ZHVP	5G503
B60L	11/18	(2006.01)	H02J	7/00	S	5H030
B60L	3/04	(2006.01)	H01M	10/44	Q	5H115
H02H	3/16	(2006.01)	B60L	11/18	C	

審査請求 有　請求項の数 4　OL　（全 15 頁）　最終頁に続く

(21)出願番号　特願2007-158723 (P2007-158723)
(22)出願日　平成19年6月15日 (2007.6.15)

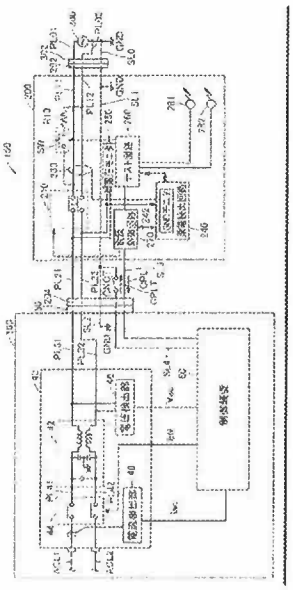
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愛知県安城市藤井町高根１０番地　アイシン・エィ・ダブリュ株式会社内

Fターム(参考)　5G004 AA01　AB02　BA01　CA08　DA01
DC11　FA01

最終頁に続く

(54)【発明の名称】充電装置および充電システム

(57)【要約】
【課題】電気機器の充電作業を円滑に行なうことが可能な充電装置およびその充電装置を備える充電システムを提供する。
【解決手段】テスト回路２６０は、まずリレー部２１０が正常であることを検査した後に漏電検出回路２４０の動作を検査する。これにより、もし、電源ラインＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２を含む給電経路に漏電が生じてもリレー部２１０によって給電経路を遮断できる可能性を高めることができる。また、電気機器１００に含まれる蓄電装置への充電を開始する前にリレー部２１０の接点の溶着が検出された場合には、制御装置６０は、蓄電装置の充電を行なわない（接続回路４４をオフ状態のままにする）ので、電気機器１００に異常が生じるのを防ぐことができる。
【選択図】図３



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【特許請求の範囲】
【請求項1】
充電可能に構成された電気機器と、前記電気機器に充電電力を供給する電源との間に設けられる充電装置であって、
前記電源からの前記充電電力を前記電気機器に給電する給電経路と、
前記給電経路の遮断が可能な遮断回路と、
前記給電経路に生じた漏電を検出する漏電検出回路と、
前記遮断回路による前記給電経路の遮断を検査するとともに、前記給電経路の遮断を確認した後に前記漏電検出回路を検査する検査回路とを備える、充電装置。
【請求項2】
充電可能な蓄電装置を含む電気機器と、
電源からの充電電力を前記蓄電装置に供給することにより前記蓄電装置を充電する充電装置とを備え、
前記充電装置は、
前記電源からの前記充電電力を前記電気機器に給電する給電経路と、
前記給電経路の遮断が可能な遮断回路と、
前記給電経路に生じた漏電を検出する漏電検出回路と、
前記遮断回路による前記給電経路の遮断を検査するとともに、前記給電経路の遮断を確認した後に前記漏電検出回路を検査する検査回路とを含む、充電システム。
【請求項3】
前記充電装置は、
前記蓄電装置の非充電時に、前記遮断回路に前記給電経路を遮断させる第１の制御回路をさらに含み、
前記遮断回路は、前記給電経路の遮断を解除可能であり、
前記電気機器は、
前記蓄電装置と前記給電経路との間の電気的な接続および非接続を行なう接続回路と、
前記蓄電装置の非充電時には、前記接続回路を接続状態に設定し、前記蓄電装置の充電時には、前記給電経路の電圧が前記給電経路の遮断時の電圧を示すと判定した場合に、前記遮断回路に前記給電経路の遮断を解除させ、かつ、前記接続回路を接続状態に設定する第２の制御回路とをさらに含む、請求項２に記載の充電システム。
【請求項4】
前記電気機器は、車両に搭載され、かつ、前記車両の動力を出力する、請求項３に記載の充電システム。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は充電装置および充電システムに関し、特に、外部電源を用いて電気自動車のバッテリを充電する際の作業を円滑にすることが可能な技術に関する。
【背景技術】
【0002】
特開２０００－３５４３３２号公報（特許文献１）は、電気自動車用充電装置を開示する。この充電装置は、外部電源から電気自動車への給電経路を開閉するリレーと、その給電経路に流れる電流に基づいて漏電を検出する漏電検出回路と、外部電源から給電回路への給電開始時に、擬似的に漏電を発生させる試験回路と、漏電検出回路が漏電を検出した場合に給電経路が開状態となるようリレーを制御する制御回路とを備える。制御回路は、充電に先立って漏電検出回路の動作を確認する。
【特許文献1】特開２００２－３５４３３２号公報
【特許文献2】特開平１１－２０５９０９号公報
【特許文献3】特開２００６－１２１８４４号公報
【発明の開示】

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【発明が解決しようとする課題】
【0003】
特開２０００－３５４３３２号公報に開示される充電装置の場合、制御装置は漏電検出回路の動作を確認するためにリレーをオンする。しかし、リレーの接点が溶着している場合には、制御回路は漏電検出回路の動作確認後に給電経路を遮断できない。この場合には漏電が生じたままになる可能性がある。これにより上述の充電装置の場合には充電作業を円滑に行なうことができなくなることも考えられる。特開２０００－３５４３３２号公報は、リレーの溶着が生じた場合の制御回路の動作については開示していない。
【0004】
本発明の目的は、電気機器の充電作業を円滑に行なうことが可能な充電装置およびその充電装置を備える充電システムを提供することである。
【課題を解決するための手段】
【0005】
本発明は要約すれば、充電可能に構成された電気機器と、電気機器に充電電力を供給する電源との間に設けられる充電装置である。充電装置は、電源からの充電電力を電気機器に給電する給電経路と、給電経路の遮断が可能な遮断回路と、給電経路に生じた漏電を検出する漏電検出回路と、遮断回路による給電経路の遮断を検査するとともに、給電経路の遮断を確認した後に漏電検出回路を検査する検査回路とを備える。
【0006】
本発明の他の局面に従うと、充電システムであって、充電可能な蓄電装置を含む電気機器と、電源からの充電電力を蓄電装置に供給することにより蓄電装置を充電する充電装置とを備える。充電装置は、電源からの充電電力を電気機器に給電する給電経路と、
給電経路の遮断が可能な遮断回路と、給電経路に生じた漏電を検出する漏電検出回路と、遮断回路による給電経路の遮断を検査するとともに、給電経路の遮断を確認した後に漏電検出回路を検査する検査回路とを含む。
【0007】
好ましくは、充電装置は、蓄電装置の非充電時に、遮断回路に給電経路を遮断させる第１の制御回路をさらに含む。遮断回路は、給電経路の遮断を解除可能である。電気機器は、蓄電装置と給電経路との間の電気的な接続および非接続を行なう接続回路と、蓄電装置の非充電時には、接続回路を接続状態に設定し、蓄電装置の充電時には、給電経路の電圧が給電経路の遮断時の電圧を示すと判定した場合に、遮断回路に給電経路の遮断を解除させ、かつ、接続回路を接続状態に設定する第２の制御回路とをさらに含む。
【0008】
さらに好ましくは、電気機器は、車両に搭載され、かつ、車両の動力を出力する。
【発明の効果】
【0009】
本発明によれば、電気機器の充電作業を円滑に行なうことができる。
【発明を実施するための最良の形態】
【0010】
以下において、本発明の実施の形態について、図面を参照しながら詳細に説明する。なお、図中の同一または相当部分については、同一符号を付してその説明は繰返さない。
【0011】
図１は、本発明の実施の形態に係る充電装置および充電システムを説明する図である。図１を参照して、本発明の実施の形態に係る充電システムは、充電可能に構成された電気機器１００と、充電装置１５０とを含む。充電装置１５０は、電気機器１００と電気機器１００を充電する交流電源３００との間に設けられる。
【0012】
電気機器１００は、電力変換部１０と、蓄電装置Ｂと、制御装置６０と、電源ラインＰＬ３１，ＰＬ３２とを含む。充電装置１５０は、コネクタ２０２，２０４と、電源ラインＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２と、充電制御装置２００とを含む。

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【0013】
交流電源３００は、たとえば１００Ｖ（２００Ｖ）／１５Ａの交流電力を供給する。コネクタ３０２は電源ラインＰＬ０１，ＰＬ０２により交流電源３００に接続される。
【0014】
コネクタ２０２をコネクタ３０２に接続することによって、電源ラインＰＬ１１が電源ラインＰＬ０１に接続されるとともに電源ラインＰＬ１２が電源ラインＰＬ０２に接続される。たとえばコネクタ２０２はプラグであり、コネクタ３０２はソケットである。
【0015】
コネクタ２０４をコネクタ５０に接続することによって、電源ラインＰＬ２１が電源ラインＰＬ３１に接続されるとともに電源ラインＰＬ２２が電源ラインＰＬ３２に接続される。
【0016】
充電制御装置２００は、リレー部２１０（遮断回路）と、漏電検出回路２４０と、テスト回路２６０とを含む。リレー部２１０は、リレーＲＹ１，ＲＹ２を含む。
【0017】
リレーＲＹ１，ＲＹ２は、テスト回路２６０の制御または制御装置６０の制御により同時に開閉する。以後、リレーＲＹ１，ＲＹ２がオン（オフ）することを「リレー部２１０がオン（オフ）する」と称することにする。リレー部２１０がオンするとリレーＲＹ１によって電源ラインＰＬ１１が電源ラインＰＬ２１に接続されるとともに、リレーＲＹ２によって電源ラインＰＬ１２が電源ラインＰＬ２２に接続される。このとき電源ラインＰＬ１１，ＰＬ２１，ＰＬ１２，ＰＬ１２は交流電源３００からの交流電力を電気機器１００に給電する給電経路を構成する。リレー部２１０がオフする（リレーＲＹ１，ＲＹ２がオフする）場合には、この給電経路が遮断される。すなわちリレー部２１０はオフ時には給電経路を遮断するとともにオン時には給電経路の遮断を解除可能である。
【0018】
漏電検出回路２４０は、給電経路に生じた漏電を検出する。テスト回路２６０は、リレー部２１０による給電経路の遮断を検査する。テスト回路２６０は、リレー部２１０による給電経路の遮断を確認した後に、給電経路に漏電を擬似的に発生させ、かつ、漏電検出回路２４０を検査する。これにより電気機器１００の充電時に漏電が発生した場合に、リレー部２１０により給電経路を遮断できる確率を高めることができる。よって本実施の形態によれば、ユーザによる充電作業を円滑に進めることが可能になる。
【0019】
次に電気機器１００について説明する。電力変換部１０は給電経路を介して交流電源３００から受ける交流電力を直流電力に変換する。蓄電装置Ｂは電力変換部１０から直流電力を受ける。これにより蓄電装置Ｂが充電される。制御装置６０は、蓄電装置Ｂの充電期間にリレー部２１０をオン状態にするとともに電力変換部１０の動作を制御する。ただし、制御装置６０は、リレー部２１０をオンさせる前に給電経路に交流電圧が印加されていることを検知した場合には、リレーの接点が溶着しているものと判定する。この場合には、制御装置６０は電力変換部１０を動作させない。これにより蓄電装置Ｂあるいは電力変換部１０に異常が生じるのを防ぐことができる。また、蓄電装置Ｂあるいは電力変換部１０に異常が生じるのを防ぐことによって、ユーザによる充電作業に影響が生じるのも防ぐことができる。よって本実施の形態によればユーザの充電作業を円滑に進めることが可能になる。
【0020】
続いて電気機器１００および充電制御装置２００の具体的構成について説明する。
図２は、図１の電気機器１００の構成例を示す図である。図２を参照して、この電気機器１００は、蓄電装置Ｂと、電力変換部１０と、制御装置６０とを備える。電力変換部１０は、昇圧コンバータ１１，１２と、インバータ２０，３０と、モータジェネレータＭＧ１，ＭＧ２と、ＡＣポート４０と、コンデンサＣ１１，Ｃ１２，Ｃ２と、抵抗Ｒ１と、電源ラインＰＬ１～ＰＬ３と、接地ラインＳＬと、Ｕ相ラインＵＬ１，ＵＬ２と、Ｖ相ライ

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ンＶＬ１，ＶＬ２と、Ｗ相ラインＷＬ１，ＷＬ２と、ＡＣラインＡＣＬ１，ＡＣＬ２とを備える。

【0021】

この電気機器１００は、たとえば、ハイブリッド自動車（Ｈｙｂｒｉｄ　Ｖｅｈｉｃｌｅ）に搭載され、車両の動力を出力する動力出力装置としてハイブリッド自動車に組込まれる。そして、モータジェネレータＭＧ１は、エンジン８０によって駆動される発電機として動作し、かつ、エンジン始動を行ない得る電動機として動作するものとしてハイブリッド自動車に組込まれ、モータジェネレータＭＧ２は、ハイブリッド自動車の駆動輪９０を駆動する電動機としてハイブリッド自動車に組込まれる。

【0022】

モータジェネレータＭＧ１，ＭＧ２は、たとえば、３相交流同期電動機からなる。モータジェネレータＭＧ１は、エンジン８０からの回転力を用いて交流電圧を発生し、その発生した交流電圧をインバータ２０へ出力する。また、モータジェネレータＭＧ１は、インバータ２０から受ける交流電圧によって駆動力を発生し、エンジン８０の始動を行なう。モータジェネレータＭＧ２は、インバータ３０から受ける交流電圧によって車両の駆動トルクを発生する。また、モータジェネレータＭＧ２は、回生制動時、交流電圧を発生してインバータ３０へ出力する。

【0023】

蓄電装置Ｂは、各々が充放電可能なバッテリＢ１，Ｂ２を含む。バッテリＢ１，Ｂ２は、たとえば、ニッケル水素やリチウムイオン等の二次電池からなる。バッテリＢ１，Ｂ２は、発生した直流電圧を昇圧コンバータ１１，１２へそれぞれ出力する。また、バッテリＢ１，Ｂ２は、昇圧コンバータ１１，１２からそれぞれ出力される直流電圧によって充電される。

【0024】

昇圧コンバータ１１は、リアクトルＬ１と、ＩＧＢＴ素子Ｑ１，Ｑ２と、ダイオードＤ１，Ｄ２とを含む。リアクトルＬ１は、電源ラインＰＬ１に一端が接続され、ＩＧＢＴ素子Ｑ１，Ｑ２の接続点に他端が接続される。ＩＧＢＴ素子Ｑ１，Ｑ２は、電源ラインＰＬ２と接地ラインＳＬとの間に直列に接続され、制御装置６０からの制御信号ＰＷＣ１をゲート電極に受ける。そして、各ＩＧＢＴ素子Ｑ１，Ｑ２のコレクタ－エミッタ間には、エミッタ側からコレクタ側へ電流を流すようにダイオードＤ１，Ｄ２がそれぞれ接続される。

【0025】

昇圧コンバータ１２は、リアクトルＬ２と、ＩＧＢＴ素子Ｑ３，Ｑ４と、ダイオードＤ３，Ｄ４とを含む。リアクトルＬ２は、電源ラインＰＬ３に一端が接続され、ＩＧＢＴ素子Ｑ３，Ｑ４の接続点に他端が接続される。ＩＧＢＴ素子Ｑ３，Ｑ４は、電源ラインＰＬ３と接地ラインＳＬとの間に直列に接続され、制御装置６０からの制御信号ＰＷＣ２をゲート電極に受ける。そして、各ＩＧＢＴ素子Ｑ３，Ｑ４のコレクタ－エミッタ間には、エミッタ側からコレクタ側へ電流を流すようにダイオードＤ３，Ｄ４がそれぞれ接続される。

【0026】

インバータ２０は、Ｕ相アーム２１、Ｖ相アーム２２およびＷ相アーム２３を含む。Ｕ相アーム２１、Ｖ相アーム２２およびＷ相アーム２３は、電源ラインＰＬ２と接地ラインＳＬとの間に並列に接続される。Ｕ相アーム２１は、直列に接続されたＩＧＢＴ素子Ｑ１１，Ｑ１２からなり、Ｖ相アーム２２は、直列に接続されたＩＧＢＴ素子Ｑ１３，Ｑ１４からなり、Ｗ相アーム２３は、直列に接続されたＩＧＢＴ素子Ｑ１５，Ｑ１６からなる。また、各ＩＧＢＴ素子Ｑ１１～Ｑ１６のコレクタ－エミッタ間には、エミッタ側からコレクタ側へ電流を流すダイオードＤ１１～Ｄ１６がそれぞれ接続されている。

【0027】

そして、各相アームにおける各ＩＧＢＴ素子の接続点は、Ｕ，Ｖ，Ｗ各相ラインＵＬ１，ＶＬ１，ＷＬ１を介してモータジェネレータＭＧ１のＵ，Ｖ，Ｗ各相コイルの反中性点

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側にそれぞれ接続される。

【0028】

インバータ３０は、Ｕ相アーム３１、Ｖ相アーム３２およびＷ相アーム３３を含む。Ｕ相アーム３１、Ｖ相アーム３２およびＷ相アーム３３は、電源ラインＰＬ２と接地ラインＳＬとの間に並列に接続される。Ｕ相アーム３１は、直列に接続されたＩＧＢＴ素子Ｑ２１，Ｑ２２からなり、Ｖ相アーム３２は、直列に接続されたＩＧＢＴ素子Ｑ２３，Ｑ２４からなり、Ｗ相アーム３３は、直列に接続されたＩＧＢＴ素子Ｑ２５，Ｑ２６からなる。また、各ＩＧＢＴ素子Ｑ２１～Ｑ２６のコレクタ－エミッタ間には、エミッタ側からコレクタ側へ電流を流すダイオードＤ２１～Ｄ２６がそれぞれ接続されている。

【0029】

そして、インバータ３０においても、各相アームにおける各ＩＧＢＴ素子の接続点は、Ｕ，Ｖ，Ｗ各相ラインＵＬ２，ＶＬ２，ＷＬ２を介してモータジェネレータＭＧ２のＵ，Ｖ，Ｗ各相コイルの反中性点側にそれぞれ接続される。

【0030】

コンデンサＣ１１は、電源ラインＰＬ１と接地ラインＳＬとの間に接続され、電圧変動に起因するバッテリＢ１および昇圧コンバータ１１への影響を低減する。コンデンサＣ１２は、電源ラインＰＬ３と接地ラインＳＬとの間に接続され、電圧変動に起因するバッテリＢ２および昇圧コンバータ１２への影響を低減する。コンデンサＣ２は、電源ラインＰＬ２と接地ラインＳＬとの間に接続され、電圧変動に起因するインバータ２０，３０および昇圧コンバータ１１，１２への影響を低減する。

【0031】

昇圧コンバータ１１は、制御装置６０からの制御信号ＰＷＣ１に基づいて、ＩＧＢＴ素子Ｑ２のスイッチング動作に応じて流れる電流をリアクトルＬ１に磁場エネルギーとして蓄積することによってバッテリＢ１からの直流電圧を昇圧し、その昇圧した昇圧電圧をＩＧＢＴ素子Ｑ２がオフされたタイミングに同期してダイオードＤ１を介して電源ラインＰＬ２へ出力する。また、昇圧コンバータ１１は、制御装置６０からの制御信号ＰＷＣ１に基づいて、電源ラインＰＬ２を介してインバータ２０および／または３０から受ける直流電圧をバッテリＢ１の電圧レベルに降圧してバッテリＢ１を充電する。

【0032】

昇圧コンバータ１２は、制御装置６０からの制御信号ＰＷＣ２に基づいて、昇圧コンバータ１１と同様の動作を行なう。これによりバッテリＢ２からの直流電圧は昇圧されて電源ラインＰＬ２に出力される。また、昇圧コンバータ１２は、制御信号ＰＷＣ２に基づいて、電源ラインＰＬ２を介してインバータ２０および／または３０から受ける直流電圧をバッテリＢ２の電圧レベルに降圧してバッテリＢ２を充電する。

【0033】

インバータ２０は、制御装置６０からの制御信号ＰＷＭ１に基づいて、電源ラインＰＬ２から受ける直流電圧を交流電圧に変換してモータジェネレータＭＧ１へ出力する。これにより、モータジェネレータＭＧ１は、所望のトルクを発生するように駆動される。また、インバータ２０は、制御装置６０からの制御信号ＰＷＭ１に基づいて、モータジェネレータＭＧ１によって発電された交流電圧を直流電圧に変換し、その変換した直流電圧を電源ラインＰＬ２へ出力する。

【0034】

インバータ３０は、制御装置６０からの制御信号ＰＷＭ２に基づいて、電源ラインＰＬ２から受ける直流電圧を交流電圧に変換してモータジェネレータＭＧ２へ出力する。これにより、モータジェネレータＭＧ２は、所望のトルクを発生するように駆動される。また、インバータ３０は、モータジェネレータＭＧ２の回生制動時、制御装置６０からの制御信号ＰＷＭ２に基づいて、モータジェネレータＭＧ２から出力される交流電圧を直流電圧に変換し、その変換した直流電圧を電源ラインＰＬ２へ出力する。

【0035】

コネクタ５０には電源ラインＰＬ３１，ＰＬ３２が接続される。ＡＣポート４０は、制

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御装置６０からの信号ＥＮに応じてＡＣラインＡＣＬ１，ＡＣＬ２と電源ラインＰＬ３１，ＰＬ３２とをそれぞれ接続したり、その接続を切離したりする。コネクタ５０が図１のコネクタ２０４と接続されることにより電源ラインＰＬ３１，ＰＬ３２に交流電圧Ｖａｃが生じる。また、ＡＣラインＡＣＬ１，ＡＣＬ２と電源ラインＰＬ３１，ＰＬ３２とがそれぞれ接続された場合に、ＡＣラインＡＣＬ１には交流電流Ｉａｃが流れる。ＡＣポート４０は、交流電圧Ｖａｃおよび交流電流Ｉａｃを検出してその検出結果を制御装置６０へ出力する。

【0036】

ＡＣラインＡＣＬ１はモータジェネレータＭＧ１の中性点Ｎ１に接続され、ＡＣラインＡＣＬ２はモータジェネレータＭＧ２の中性点Ｎ２に接続される。車両の停止時、かつ、蓄電装置Ｂへの充電時には、制御装置６０はＡＣポート４０に信号ＥＮを出力してＡＣラインＡＣＬ１，ＡＣＬ２と電源ラインＰＬ３１，ＰＬ３２とをそれぞれ接続する。さらに、制御装置６０は、インバータ２０，３０を制御することによって中性点Ｎ１，Ｎ２間に生じる交流電圧Ｖａｃを直流電圧に変換する。さらに制御装置６０は昇圧コンバータ１１，１２を制御して、インバータ２０，３０からの直流電圧をバッテリＢ１，Ｂ２の充電に適した電圧に変換する。これによりバッテリＢ１，Ｂ２が充電される。

【0037】

具体的には、制御装置６０は、モータジェネレータＭＧ１，ＭＧ２のトルク指令値およびモータ回転数、バッテリＢ１，Ｂ２のバッテリ電圧、ならびに電源ラインＰＬ２，ＰＬ３の電圧に基づいて、昇圧コンバータ１１，１２をそれぞれ駆動するための制御信号ＰＷＣ１，ＰＷＣ２を生成する。制御装置６０は、制御信号ＰＷＣ１，ＰＷＣ２を昇圧コンバータ１１，１２へそれぞれ出力する。なお、モータジェネレータＭＧ１，ＭＧ２の回転数、バッテリＢ１，Ｂ２の電圧および電源ラインＰＬ２，ＰＬ３の電圧は、図示されない各センサによって検出される。

【0038】

また、制御装置６０は、電源ラインＰＬ２の電圧ならびにモータジェネレータＭＧ１のモータ電流およびトルク指令値に基づいて、モータジェネレータＭＧ１を駆動するための制御信号ＰＷＭ１を生成する。さらに、制御装置６０は、電源ラインＰＬ２の電圧ならびにモータジェネレータＭＧ２のモータ電流およびトルク指令値に基づいて、モータジェネレータＭＧ２を駆動するための制御信号ＰＷＭ２を生成する。

【0039】

なお、バッテリＢ１の正極および負極を電源ラインＰＬ１および接地ラインＳＬにそれぞれ接続するためのリレー回路、および、バッテリＢ２の正極および負極を電源ラインＰＬ３および接地ラインＳＬにそれぞれ接続するためのリレー回路が設けられていてもよい。

【0040】

図３は、図２のＡＣポート４０および図１の充電装置１５０の構成を説明する図である。図３を参照して、ＡＣポート４０は、ＬＣフィルタ４２と、接続回路４４と、電源ラインＰＬ４１，ＰＬ４２と、電圧検出部４６と、電流検出部４８とを含む。

【0041】

ＬＣフィルタ４２は、電源ラインＰＬ３１，ＰＬ３２の間の交流電圧に含まれる高周波ノイズを除去する。高周波ノイズが除去された交流電圧は電源ラインＰＬ４１，ＰＬ４２に出力される。接続回路４４は、制御装置６０からの信号ＥＮに応じてオン／オフされる。接続回路４４はオン状態において電源ラインＰＬ４１とＡＣラインＡＣＬ１とを接続するとともに電源ラインＰＬ４２とＡＣラインＡＣＬ２とを接続する。接続回路４４は蓄電装置Ｂと給電経路との間の電気的な接続および非接続を行なう接続回路である。

【0042】

電圧検出部４６は電源ラインＰＬ３１，ＰＬ３２間の交流電圧Ｖａｃを検出して検出結果を制御装置６０に出力する。電流検出部４８はＡＣラインＡＣＬ１に流れる交流電流Ｉａｃを検出して検出結果を制御装置６０に出力する。なお電流検出部４８はＡＣラインＡ

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ＣＬ２に流れる電流を検出してもよい。

【0043】

充電装置１５０は、コネクタ２０２、２０４と、電源ラインＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２と、接地ラインＳＬ１～ＳＬ３と、スイッチＣＮＣＴと、充電制御装置２００とを含む。

【0044】

接地ラインＳＬ１はコネクタ２０２，５０２を介して接地ラインＳＬ０に接続される。接地ラインＳＬ０は交流電源３００の電源ラインＰＬ０２に接続されるとともに接地ノード（図中ＧＮＤと示す）に接続される。これにより接地ラインＳＬ１も接地される。なお、接地ラインＳＬ０（電源ラインＰＬ０２）の電圧を基準として電源ラインＰＬ０１の電圧は変化する。

【0045】

接地ラインＳＬ１は、さらにコネクタ２０４，５０を介して電気機器１００側の接地ラインＳＬ２に接続される。これにより接地ラインＳＬ２も接地される。

【0046】

接地ラインＳＬ３はスイッチＣＮＣＴの一方端と接地ラインＳＬ１とを接続する。スイッチＣＮＣＴの他方端はコネクタ２０４，コネクタ５０を介して、電気機器１００側の接地ラインＳＬ４に電気的に接続される。

【0047】

充電制御装置２００は、スイッチＳＷと、抵抗Ｒ１０と、ＺＣＴ（零相変流器）２３０と、漏電検出回路２４０と、電圧モニタ２５０と、テスト回路２６０と、電源制御回路２７０と、ＡＣ通電ランプ２８１と、異常ランプ２８２とを含む。

【0048】

スイッチＳＷおよび抵抗Ｒ１０は電源ラインＰＬ１１と電源ラインＰＬ１２との間に直列に接続される。ＺＣＴ２３０は電源ラインＰＬ１１，ＰＬ１２を囲むように設けられる。電源ラインＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２を含む給電経路のいずれかの箇所で漏電が生じると、ＺＣＴ２３０の出力側に不平衡電流が流れる。この不平衡電流は漏電検出回路２４０により検出される。

【0049】

漏電検出回路２４０は電源ラインＰＬ２２の電圧（グランド電圧）をモニタするＧＮＤ（グランド）電圧モニタ２４２を含む。漏電検出回路２４０はＺＣＴ２３０の検出結果およびＧＮＤ電圧モニタ２４２の検出結果に基づいて給電経路に漏電が生じたことを検出する。たとえば不平衡電流のレベルが所定値以上であれば、漏電検出回路２４０は漏電が生じているものと判断する。

【0050】

電圧モニタ２５０は電源ラインＰＬ２１，ＰＬ２２間の電圧をモニタして、モニタ結果（電圧値）をテスト回路２６０に出力する。テスト回路２６０は、リレー部２１０の検査時に電源制御回路２７０にリレー部２１０をオン／オフするよう指示する。電源制御回路２７０はテスト回路２６０からの指示に応じてリレー部２１０をオン／オフする。

【0051】

テスト回路２６０は、漏電検出回路２４０の検査時にはスイッチＳＷをオン状態にする。スイッチＳＷがオンすると電源ラインＰＬ１１，ＰＬ１２が短絡する。これによりＺＣＴ２３０の出力側に不平衡電流が流れるので漏電検出回路２４０は漏電が生じていると判断する。

【0052】

テスト回路２６０は、漏電検出回路２４０から漏電を検出したことを示す信号を受けた場合に漏電検出回路２４０が正常であると判断する。テスト回路２６０は、漏電検出回路２４０の検査を終了した後にスイッチＳＷをオフにする。

【0053】

テスト回路２６０は、電気機器１００の充電開始時に電圧モニタ２５０から受ける電圧

値がたとえばＡＣ１００Ｖを示す場合には、リレー部２１０がオンしたと判断する。この場合、テスト回路２６０はＡＣ通電ランプ２８１を点灯させる。ＡＣ通電ランプ２８１はたとえば緑色に点灯する。

【００５４】

テスト回路２６０は、電圧モニタ２５０から受ける電圧値に基づいて、リレー部２１０に異常が生じた（接点が溶着した）と判定すると、異常ランプ２８２を点灯させる。異常ランプ２８２はたとえば赤色に点灯する。

【００５５】

電源制御回路２７０は、テスト回路２６０からの指示に応じて、リレー部２１０の検査時にリレー部２１０をオン／オフさせる。なおリレー部２１０の検査期間は蓄電装置Ｂの非充電期間に含まれる。すなわち、電源制御回路２７０は、蓄電装置Ｂの非充電時にリレー部２１０に給電経路を遮断させる制御回路である。

【００５６】

さらに電源制御回路２７０は、交流電源３００の電圧および電流容量を示す信号ＣＰＬを生成し、信号ＣＰＬを制御装置６０に出力する。たとえば信号ＣＰＬのデューティ比は電流容量を示し、信号ＣＰＬの波高値は電圧を示す。制御装置６０は、信号ＣＰＬに含まれる電流容量および電圧の情報に基づいて、蓄電装置Ｂが適切に充電されるように電力変換部１０を制御する。

【００５７】

スイッチＣＮＣＴは、コネクタ２０４をコネクタ５０に接続することによりオン状態となり、コネクタ２０４をコネクタ５０から外すとオフ状態となる。スイッチＣＮＣＴがオン状態となると、接地ラインＳＬ４が接地ラインＳＬ３に接続される。これにより接地ラインＳＬ４が接地される。

【００５８】

制御装置６０は、接地ラインＳＬ４の電圧を検知することによりコネクタ２０４がコネクタ５０に接続されたことを検知する。制御装置６０は、コネクタ２０４がコネクタ５０に接続されたことを検知すると、電圧検出部４６の検出結果が給電経路の遮断時の電圧を示すかどうかを判定する。

【００５９】

制御装置６０は、その検出結果が給電経路の遮断時の電圧であると判定した場合に、リレー部２１０をオン状態にする（給電経路の遮断を解除する）ための信号ＣＰＬＴのレベルをＬ（論理ロー）レベルからＨ（論理ハイ）レベルに変化させる。電源制御回路２７０は、信号ＣＰＬＴがＨレベルである場合にリレー部２１０をオンさせ、信号ＣＰＬＴがＬレベルである場合にリレー部２１０をオフさせる。なお、信号ＣＰＬＴがＬレベルである場合にリレー部２１０がオンし、信号ＣＰＬＴがＨレベルである場合にリレー部２１０がオフしてもよい。

【００６０】

さらに制御装置６０は、接続回路４４をオンさせる。これにより蓄電装置Ｂが給電経路に接続される。リレー部２１０の接点が溶着した状態で接続回路４４をオンさせると、インバータ２０，３０に影響が生じる可能性がある。インバータ２０，３０に生じた影響は、蓄電装置Ｂにも及ぶ可能性がある。しかし、上述のように、制御装置６０はリレー部２１０がオフしている（給電経路の電圧が給電経路の遮断時の電圧を示す）ことを確認した後に蓄電装置Ｂの充電を開始する（接続回路４４をオンする）。よって、このような問題が生じるのを防ぐことができる。

【００６１】

図４は、ユーザによる電気機器１００の充電作業を説明するフローチャートである。図４および図３を参照して、ユーザは交流電源３００のコネクタ３０２にコネクタ２０２を接続する（ステップＳ１）。次にユーザは電気機器１００（車両）のコネクタ５０にコネクタ２０４を接続する（ステップＳ２）。これにより電気機器１００の充電が開始される。ユーザは電気機器１００の充電が完了すると、車両側のコネクタ５０に接続されたコネ

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タ２０４を外し（ステップＳ３）、次に交流電源３００のコネクタ３０２に接続されたコネクタ２０２を外す（ステップＳ４）。なお、ステップＳ１，Ｓ２の処理は順番が逆でもよい。同様にステップＳ３，Ｓ４の処理は順番が逆でもよい。

【００６２】

図５は、図４に示すユーザの充電作業により実行される充電制御装置２００の処理および電気機器１００の処理を説明するフローチャートである。図５および図３を参照して、充電制御装置２００はステップＳ１１～Ｓ２０の処理を実行する。電気機器１００は、ステップＳ３１～Ｓ３８の処理を実行する。

【００６３】

ステップＳ１（図４参照）において、コネクタ２０２がコネクタ３０２に接続されると交流電源３００から充電制御装置２００に電圧が供給される。この電圧供給がトリガとなって充電制御装置２００の動作が開始される。まず、テスト回路２６０は電圧モニタ２５０から電圧値を取得する。テスト回路２６０は、その電圧値に基づいてリレー部の接点が溶着していないかどうかをセルフチェックする（ステップＳ１１）。

【００６４】

たとえばリレー部２１０が正常である（接点が溶着していない）場合には電圧値はＡＣ０Ｖを示し、リレー部２１０の接点が溶着している場合には電圧値はＡＣ１００Ｖを示す。よって、テスト回路２６０は電圧値に基づいてリレー部２１０が正常か否かを判定することができる。

【００６５】

テスト回路２６０はセルフチェックの結果からリレー部２１０が正常か否かを判定する（ステップＳ１２）。リレー部２１０が正常でない場合（ステップＳ１２においてＮＯ）、テスト回路２６０は異常ランプ２８２を点灯させる（ステップＳＡ）。リレー部２１０が正常である場合（ステップＳ１２においてＹＥＳ）、テスト回路２６０は電源制御回路２７０に信号ＣＰＬを出力するよう指示する。電源制御回路２７０は、テスト回路２６０の指示に応じて、交流電源３００の電流容量および電圧を示す信号ＣＰＬを生成して出力する。さらにテスト回路２６０は電源制御回路２７０にリレー部２１０をオフさせる（ステップＳ１３）。

【００６６】

一方、電気機器１００において制御装置６０は接地ラインＳＬ４の電圧をモニタする。ステップＳ２（図４参照）において、コネクタ２０４がコネクタ５０に接続されると接地ラインＳＬ４の電圧が接地電圧レベルになる。これにより、制御装置６０はスイッチＣＮＣＴがオンしたことを検知する。さらに、制御装置６０は電源制御回路２７０からの信号ＣＰＬを受けることによって電気機器１００に供給される交流電力の情報を取得する（ステップＳ３１）。

【００６７】

ステップＳ３１の処理に続き、制御装置６０は現時点での処理の段階がリレー部２１０のオンを許可する（信号ＣＰＬＴをＬレベルからＨレベルに切換える）前の段階であり、かつ、電圧検出部４６によって、たとえば１００ＶのＡＣ電圧（交流電圧Ｖａｃ）が検出されているかどうかを判定する（ステップＳ３２）。

【００６８】

制御装置６０がリレー部２１０のオンを許可する前であるにも拘らず電圧検出部４６がＡＣ１００Ｖの電圧値を検出した場合には、リレー部２１０の接点が溶着している可能性が高い。この場合（ステップＳ３２においてＹＥＳ）、制御装置６０はテスト回路２６０にリレー部２１０の溶着を示す情報を送り、テスト回路２６０はこの情報を受けて異常ランプ２８２を点灯させる（ステップＳＡ）。なおテスト回路２６０は電圧モニタ２５０の検出結果に基づいてリレー部２１０が溶着したと判定してもよい。テスト回路２６０は制御装置６０からの情報または電圧モニタ２５０に基づいて、リレー部２１０による給電経路の遮断を検査する。

【００６９】

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一方、制御装置６０がリレー部２１０のオンを許可する前であり、かつ、電圧値が０Ｖである場合（ステップＳ３２においてＮＯ）、制御装置６０はリレー部２１０がオフしているものと判定する。この場合には、制御装置６０は、電力変換部１０を制御することにより蓄電装置Ｂの充電の準備を完了させる（ステップＳ３３）。そして、充電準備が完了すると、制御装置６０は電源制御回路２７０にリレー部２１０をオンさせるため、信号ＣＰＬＴのレベルをＬレベルからＨレベルに切換える。

【0070】

一方、充電制御装置２００において、電源制御回路２７０は制御装置６０から受ける信号ＣＰＬＴのレベルがＬレベルからＨレベルに変化したか否かを判定する（ステップＳ１４）。信号ＣＰＬＴのレベルがＬレベルのまま変化しない場合（ステップＳ１４においてＮＯ）、ステップＳ１４の判定処理が繰返される。信号ＣＰＬＴのレベルがＬレベルからＨレベルに変化した場合（ステップＳ１４においてＹＥＳ）、電源制御回路２７０はリレー部２１０をオフ状態からオン状態に切換える（ステップＳ１５）。

【0071】

次にテスト回路２６０はスイッチＳＷをオンすることにより給電経路に漏電を発生させる。さらに、テスト回路２６０は漏電発生時にリレー部２１０がオフできるか否かをテストする（ステップＳ１６）。

【0072】

漏電検出回路２４０が正常である場合には、漏電検出回路２４０は漏電を検出して、その検出結果をテスト回路２６０に出力する。これによりテスト回路２６０は漏電検出回路２４０が正常か否かを検査する。漏電検出回路２４０が正常であればテスト回路２６０は電源制御回路２７０にリレー部２１０をオフさせる。

【0073】

ステップＳ１７において、テスト回路２６０は、漏電発生時にリレー部２１０をオフできるか否かを判定する。漏電発生時にリレー部２１０をオフできない場合（ステップＳ１７においてＮＯ）、テスト回路２６０は、スイッチＳＷをオフする。さらにテスト回路２６０は異常ランプ２８２を点灯させる（ステップＳＡ）。

【0074】

ステップＳ１６において漏電検出回路２４０およびリレー部２１０が正常に動作していればリレー部２１０はオフ状態になっている。この場合（ステップＳ１７においてＹＥＳ）、テスト回路２６０はスイッチＳＷをオフするとともに、リレー部２１０をオンするよう電源制御回路２７０に指示する。応じて電源制御回路２７０はリレー部２１０をオフ状態からオン状態に切換える（ステップＳ１８）。リレー部２１０がオンすると、テスト回路２６０はＡＣ通電ランプ２８１を点灯させる（ステップＳ１９）。

【0075】

ステップＳ１５においてリレー部２１０がオンすると、電圧検出部４６はＡＣ電圧（たとえばＡＣ１００Ｖ）を検出する（ステップＳ３４）。そうすると制御装置６０は電力変換部１０を制御することにより蓄電装置Ｂの充電を開始する（ステップＳ３５）。

【0076】

制御装置６０は、所定の充電終了条件が満たされる場合に蓄電装置Ｂの充電を終了する（ステップＳ３６）。この条件は、たとえばバッテリＢ１，Ｂ２の電圧値がともに所定値以上であるときに満たされる。次に制御装置６０は、リレー部２１０をオフするため信号ＣＰＬＴのレベルをＨレベルからＬレベルに切換える（ステップＳ３７）。

【0077】

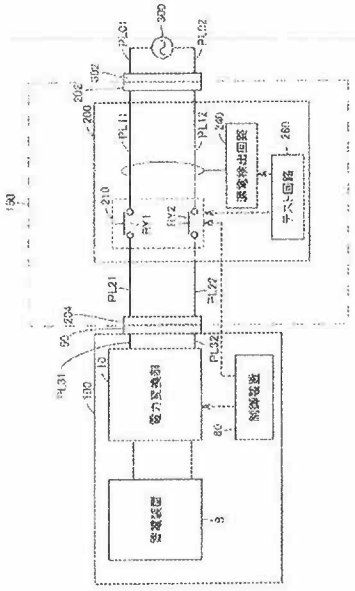
充電制御装置２００では、電源制御回路２７０が信号ＣＰＬＴのレベルの切換わりを検出する。これにより電源制御回路２７０はリレー部２１０をオン状態からオフ状態に切換える（ステップＳ２０）。ユーザがステップＳ５（図４参照）においてコネクタ２０４をコネクタ５０から外すと、電気機器１００側の充電処理が終了する。また、ユーザがステップＳ４（図４参照）においてコネクタ２０２をコネクタ３０２から外すと充電制御装置２００の処理が終了する。

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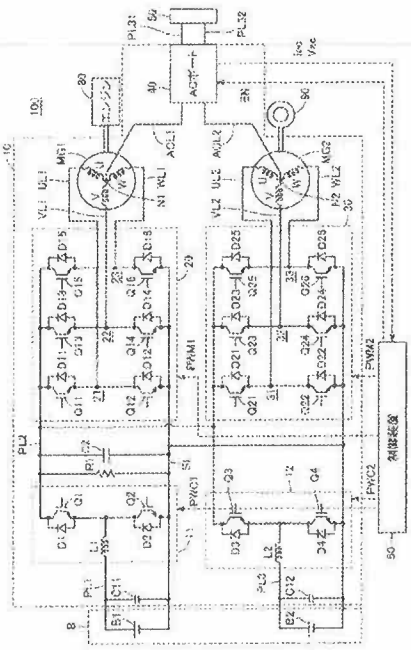
【0078】
このように本実施の形態では、テスト回路２６０は、まずリレー部２１０が正常であることを検査した後に漏電検出回路２４０の動作を検査する。これにより、もし電源ラインＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２を含む給電経路に漏電が生じてもリレー部２１０によって給電経路を遮断できる可能性を高めることができる。よって、本実施の形態によれば、充電作業を円滑に行なうことができる。
【0079】
また、本実施の形態では、蓄電装置Ｂへの充電を開始する前にリレー部２１０の接点の溶着が検出された場合には、制御装置６０は、蓄電装置Ｂの充電を行なわない（接続回路４４をオフ状態のままにする）ので、電力変換部１０や蓄電装置Ｂに異常が生じるのを防ぐことができる。これによりユーザによる充電作業に影響が生じるのも防ぐことができる。よって本実施の形態によればユーザの充電作業を円滑に進めることが可能になる。
【0080】
なお本実施の形態では電気機器１００はハイブリッド自動車に搭載される。しかし、この発明においては、電気機器１００は電気自動車（Ｅｌｅｃｔｒｉｃ　Ｖｅｈｉｃｌｅ）や燃料電池自動車に搭載されてもよい。
【0081】
今回開示された実施の形態はすべての点で例示であって制限的なものではないと考えられるべきである。本発明の範囲は上記した説明ではなくて特許請求の範囲によって示され、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれることが意図される。
【図面の簡単な説明】
【0082】
【図１】本発明の実施の形態に係る充電装置および充電システムを説明する図である。
【図２】図１の電気機器１００の構成例を示す図である。
【図３】図２のＡＣポート４０および図１の充電装置１５０の構成を説明する図である。
【図４】ユーザによる電気機器１００の充電作業を説明するフローチャートである。
【図５】図４に示すユーザの充電作業により実行される充電制御装置２００の処理および電気機器１００の処理を説明するフローチャートである。
【符号の説明】
【0083】
１０　電力変換部、１１，１２　昇圧コンバータ、２０，３０　インバータ、２１，３１　Ｕ相アーム、２２，３２　Ｖ相アーム、２３，３３　Ｗ相アーム、４０　ＡＣポート、４２　ＬＣフィルタ、４４　接続回路、４６　電圧検出部、４８　電流検出部、５０，２０２，２０４，３０２　コネクタ、６０　制御装置、８０　エンジン、９０　駆動輪、１００　電気機器、１５０　充電装置、２００　充電制御装置、２１０　リレー部、２４０　漏電検出回路、２４２　ＧＮＤ電圧モニタ、２５０　電圧モニタ、２６０　テスト回路、２７０　電源制御回路、２８１　ＡＣ通電ランプ、２８２　異常ランプ、３００　交流電源、３０２　コネクタ、ＡＣＬ１，ＡＣＬ２　ＡＣライン、Ｂ　蓄電装置、Ｂ１，Ｂ２　バッテリ、Ｃ１１，Ｃ１２，Ｃ２　コンデンサ、ＣＮＣＴ，ＳＷ　スイッチ、Ｄ１～Ｄ４，Ｄ１１～Ｄ１６，Ｄ２１～Ｄ２６　ダイオード、Ｌ１，Ｌ２　リアクトル、ＭＧ１，ＭＧ２　モータジェネレータ、Ｎ１，Ｎ２　中性点、ＰＬ０１，ＰＬ０２，ＰＬ１～ＰＬ３，ＰＬ１１，ＰＬ１２，ＰＬ２１，ＰＬ２２，ＰＬ３１，ＰＬ３２，ＰＬ４１，ＰＬ４２　電源ライン、Ｑ１～Ｑ４，Ｑ１１～Ｑ１６，Ｑ２１～Ｑ２６　ＩＧＢＴ素子、Ｒ１，Ｒ１０　抵抗、ＲＹ１，ＲＹ２　リレー、ＳＬ，ＳＬ０～ＳＬ４　接地ライン、ＵＬ１，ＵＬ２　Ｕ相ライン、ＶＬ１，ＶＬ２　Ｖ相ライン、ＷＬ１，ＷＬ２　Ｗ相ライン。

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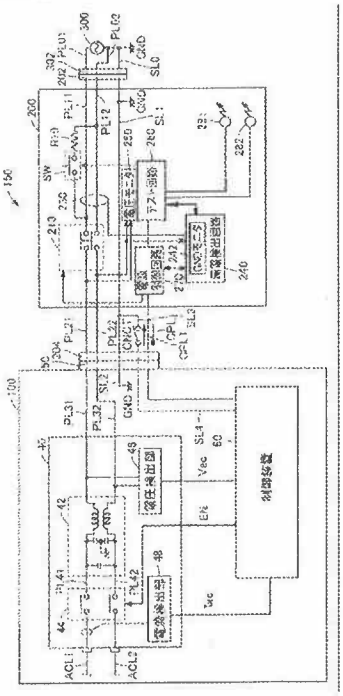
【図1】



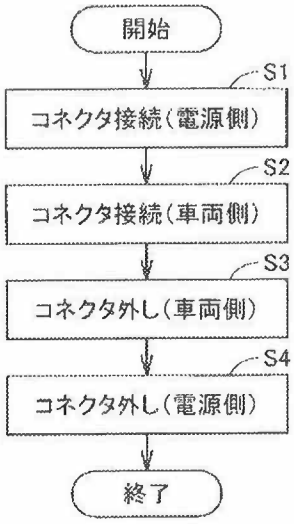
【図2】



【図3】

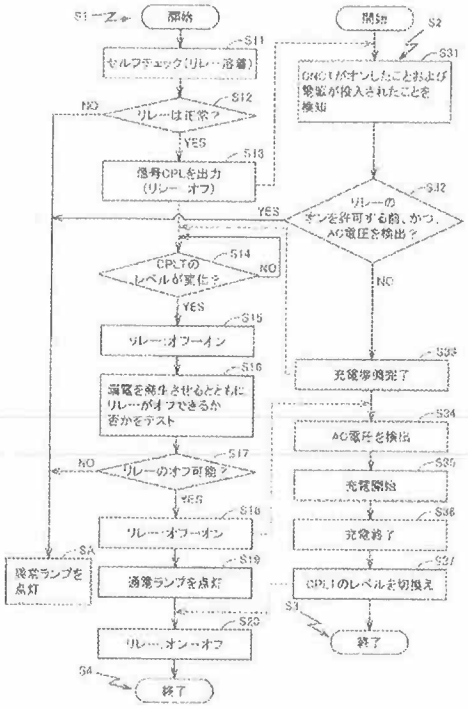


【図4】



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【図５】



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5H115 PA08 PA14 PC06 PG04 PH16 PI14 PI01 PU21 QN03 TI12
TI13 TR01 TR03 TU01 TU04 TZ03

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Espacenet

Bibliographic data: JP2009148139 (A) — 2009-07-02

VEHICLE POWER SUPPLY APPARATUS

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Applicant(s): TOYOTA MOTOR CORP; AISIN AW CO ± (TOYOTA MOTOR CORP, ; AISIN AW CO LTD)

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- cooperative: B60K6/32; B60K6/365; B60K6/445; B60L11/123; B60L11/14; B60L11/1853; B60L11/1879; B60L3/0038; B60L3/0046; B60W20/50; B60K1/02; B60L2210/40; B60L2270/20; B60W20/00; Y02T10/6217; Y02T10/6239; Y02T10/7005; Y02T10/705; Y02T10/7077; Y02T10/7241; Y02T90/34

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Also published as: CN101896373 (A) EP2226215 (A1) EP2226215 (A4) JP4288333 (B1) US2010244558 (A1) more

Abstract of JP2009148139 (A)

PROBLEM TO BE SOLVED: To provide a vehicle power supply apparatus which evacuates a vehicle while keeping a running performance as much as possible even when a sensor trouble occurs. ;SOLUTION: When such a failure as an output from a voltage sensor (13) becomes unavailable is detected, a controller (30) disconnects a connecting section (40S) and controls a voltage converter (12S) to a voltage unconverted state so that the voltage of a positive pole bus (PL2) is output to the terminal of the voltage converter (12S) on the connecting section (40S) side, and performs voltage control of the positive pole bus (PL2) based on the output from a voltage sensor (21S) in place of the output from the voltage sensor (13). ;COPYRIGHT: (C)2009,JPO&INPIT

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B60L	11/14	(2006.01)	B60L	11/14		5H115
H02M	7/48	(2007.01)	H02M	7/48	M	
B60R	16/03	(2006.01)	B60R	16/02	670S	

審査請求 有　請求項の数 7　OL　（全 18 頁）

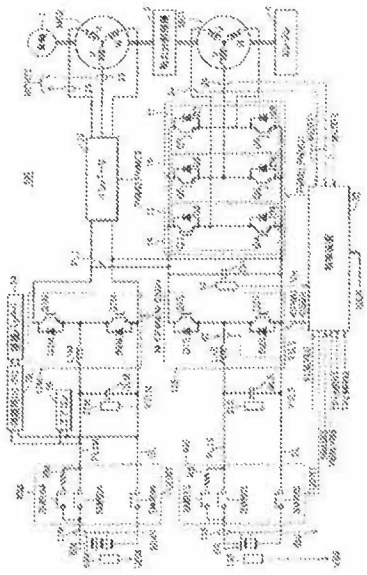
(21)出願番号　特願2007-325892(P2007-325892)
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最終頁に続く

(54)【発明の名称】車両の電源装置

(57)【要約】
【課題】センサ故障発生時であっても可能な限り走行性能を維持した状態で退避走行をすることが可能な車両の電源装置を提供する。
【解決手段】制御装置30は、電圧センサ13の出力が使用不可となる故障を検出した場合には、接続部40Sを非接続状態とし、かつ電圧コンバータ12Sを電圧非変換状態に制御して電圧コンバータ12Sの接続部40S側端子に正極母線PL2の電圧を出力させ、電圧センサ13の出力に代えて電圧センサ21Sの出力に基づいて正極母線PL2の電圧制御を行なう。
【選択図】図1



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【特許請求の範囲】
【請求項1】
第１の蓄電装置と、
モータを駆動するインバータに給電を行なう電源ラインと、
前記第１の蓄電装置と前記電源ラインとの間に設けられ、電圧変換を行なう第１の電圧コンバータと、
第２の蓄電装置と、
前記第２の蓄電装置と前記電源ラインとの間に設けられ、電圧変換を行なう第２の電圧コンバータと、
前記第２の蓄電装置と前記第２の電圧コンバータとの間に設けられ、電気的な接続状態の切換えを行なう接続部と、
前記電源ラインの電圧を検出する第１の電圧センサと、
前記第２の電圧コンバータの前記接続部側端子の電圧を検出する第２の電圧センサと、
前記第１、第２の電圧コンバータおよび前記接続部の制御を行なう制御装置とを備え、
前記制御装置は、前記第１の電圧センサの出力が使用不可となる故障を検出した場合には、前記接続部を非接続状態とし、かつ前記第２の電圧コンバータを電圧非変換状態に制御して前記第２の電圧コンバータの前記接続部側端子に前記電源ラインの電圧を出力させ、前記第１の電圧センサの出力に代えて前記第２の電圧センサの出力に基づいて前記電源ラインの電圧制御を行なう、車両の電源装置。
【請求項2】
前記電源ラインは、
正極母線と、
負極母線とを含み、
車両の電源装置は、
前記正極母線と前記負極母線との間に接続される平滑コンデンサをさらに含み、
前記制御装置は、前記電源ラインの電圧制御の一つとして、前記平滑コンデンサに対するプリチャージ制御を行なう、請求項１に記載の車両の電源装置。
【請求項3】
前記第１の蓄電装置と前記第１の電圧コンバータとの間に設けられ、電気的な接続状態を第１の接続状態、前記第１の接続状態よりも抵抗の高い第２の接続状態および非接続状態の間で切換えを行なうマスター接続部をさらに備え、
前記制御装置は、前記プリチャージ制御において、車両起動指示に応じて前記マスター接続部を遮断状態から前記第２の接続状態に切換えて前記平滑コンデンサに対するプリチャージを開始させ、その後、前記第２の電圧センサの出力に基づいて前記マスター接続部を前記第２の接続状態から前記第１の接続状態に切換える、請求項２に記載の車両の電源装置。
【請求項4】
前記制御装置は、前記電源ラインの電圧制御の一つとして、前記第１の電圧コンバータに対する電圧制御を行なう、請求項１に記載の車両の電源装置。
【請求項5】
前記制御装置は、前記第１の電圧センサの出力が使用可能である場合には、前記第１の電圧センサの出力に基づいて前記第１の電圧コンバータを電圧制御するとともに、前記接続部を接続状態とし前記第２の電圧コンバータを通過する電流が目標電流となるように前記第２の電圧コンバータを電流制御する、請求項４に記載の車両の電源装置。
【請求項6】
前記第１の電圧センサと、前記第２の電圧センサとは、測定可能入力電圧範囲が等しい、請求項１に記載の車両の電源装置。
【請求項7】
前記第１の蓄電装置と前記第１の電圧コンバータとの間に設けられ、電気的な接続状態

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の切換えを行なうマスター接続部と、
前記第１の電圧コンバータの前記マスター接続部側電子の電圧を検出する第３の電圧センサとをさらに備え、
前記第１、第２の電圧センサの測定可能な上限電圧は、前記第３の電圧センサの測定可【発明の詳細な説明】い、請求項６に記載の車両の電源装置。
【技術分野】
【０００１】
この発明は、車両の電源装置に関し、特に複数の蓄電装置と複数の電圧コンバータとを備える車両の電源装置に関する。
【背景技術】
【０００２】
特開２００２－１０５０２号公報（特許文献１）は、複数の蓄電池の充電と放電を同時に行なう蓄電池用充放電装置を開示する。この蓄電池用充放電装置は、交流電源を整流する充電用整流回路と、この充電用整流回路と並列に蓄電池の電気量を上記交流電源に回生する回生用整流回路と、上記充電用整流回路の出力に出力を制御するスイッチング素子を有する昇降圧コンバータと、上記昇降圧コンバータの出力を平滑する平滑コンデンサと、上記平滑コンデンサの両端電圧を検出する第１電圧検出器と、上記蓄電池の蓄電池電圧を検出する第２電圧検出器とを含む。そして、上記第１電圧検出器の検出信号が上記第２電圧検出器の検出信号になるように、上記昇降圧コンバータを制御するものである。
【０００３】
このように昇降圧コンバータを制御することにより、蓄電池ごとに放電開始時の突入電流を制限する大容量の限流抵抗を設けることも、また限流抵抗と開閉手段を設ける必要もなくなる。
【特許文献１】特開２００２－１０５０２号公報
【特許文献２】特開２００６－３２５３２２号公報
【発明の開示】
【発明が解決しようとする課題】
【０００４】
近年、環境に配慮した車両として、モータで車輪を駆動する電気自動車、燃料電池自動車や、モータとエンジンとを動力源として併用するハイブリッド自動車が注目されている。このような車両において、蓄電池等の電圧源を昇降圧コンバータで昇圧してモータ駆動用のインバータに供給することも行なわれている。
【０００５】
また、このような車両においては、燃費と動力性能の両立や無補給走行距離の伸長のため、複数の蓄電装置を搭載することが検討されている。車両の電源装置においても、複数の蓄電装置を搭載する場合には、放電開始時の突入電流を制限する大容量の限流抵抗を設けることも必要であり、また限流抵抗と開閉手段を蓄電装置ごとに設ける必要もある。
【０００６】
上記の特開２００２－１０５０２号公報（特許文献１）は、商用電源である三相交流電源に接続される装置であって、蓄電池の充放電テストを行なう装置に関するものである。このような試験設備であれば、たとえば、充放電テストを実行するために電圧を測定する電圧センサに故障が生じた場合、装置を停止して修理すればよい。
【０００７】
しかし、車両の場合には、センサ故障が生じても、走行が可能であれば故障の修理可能な場所まで車両が自力で走行できる方が好ましい。また、そのような退避走行中であっても、たとえば、追い越し等をしなければならない場合もあるので、蓄電池の電圧を昇圧して高性能で走行できる方が好ましい。したがって、車両の電源装置であれば、センサ故障が生じても可能な限りシステムを起動させ、性能を維持する必要がある。
【０００８】
この発明の目的は、センサ故障発生時であっても可能な限り走行性能を維持した状態で

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退避走行をすることが可能な車両の電源装置を提供することである。

【課題を解決するための手段】

【0009】

この発明は、要約すると、車両の電源装置であって、第１の蓄電装置と、モータを駆動するインバータに給電を行なう電源ラインと、第１の蓄電装置と電源ラインとの間に設けられ、電圧変換を行なう第１の電圧コンバータと、第２の蓄電装置と、第２の蓄電装置と電源ラインとの間に設けられ、電圧変換を行なう第２の電圧コンバータと、第２の蓄電装置と第２の電圧コンバータとの間に設けられ、電気的な接続状態の切換えを行なう接続部と、電源ラインの電圧を検出する第１の電圧センサと、第２の電圧コンバータの接続部側端子の電圧を検出する第２の電圧センサと、第１、第２の電圧コンバータおよび接続部の制御を行なう制御装置とを備える。制御装置は、第１の電圧センサの出力が使用不可となる故障を検出した場合には、接続部を非接続状態とし、かつ第２の電圧コンバータを電圧非変換状態に制御して第２の電圧コンバータの接続部側端子に電源ラインの電圧を出力させ、第１の電圧センサの出力に代えて第２の電圧センサの出力に基づいて電源ラインの電圧制御を行なう。

【0010】

好ましくは、電源ラインは、正極母線と、負極母線とを含む。車両の電源装置は、正極母線と負極母線との間に接続される平滑コンデンサをさらに含む。制御装置は、電源ラインの電圧制御の一つとして、平滑コンデンサに対するプリチャージ制御を行なう。

【0011】

より好ましくは、車両の電源装置は、第１の蓄電装置と第１の電圧コンバータとの間に設けられ、電気的な接続状態を第１の接続状態、第１の接続状態よりも抵抗の高い第２の接続状態および非接続状態の間で切換えを行なうマスター接続部をさらに備える。制御装置は、プリチャージ制御において、車両起動指示に応じてマスター接続部を遮断状態から第２の接続状態に切換えて平滑コンデンサに対するプリチャージを開始させ、その後、第２の電圧センサの出力に基づいてマスター接続部を第３の接続状態から第１の接続状態に切換える。

【0012】

好ましくは、制御装置は、電源ラインの電圧制御の一つとして、第１の電圧コンバータに対する電圧制御を行なう。

【0013】

より好ましくは、制御装置は、第１の電圧センサの出力が使用可能である場合には、第１の電圧センサの出力に基づいて第１の電圧コンバータを電圧制御するとともに、接続部を接続状態とし第２の電圧コンバータを通過する電流が目標電流となるように第２の電圧コンバータを電流制御する。

【0014】

好ましくは、第１の電圧センサと、第２の電圧センサとは、測定可能入力電圧範囲が等しい。

【0015】

より好ましくは、車両の電源装置は、第１の蓄電装置と第１の電圧コンバータとの間に設けられ、電気的な接続状態の切換えを行なうマスター接続部と、第１の電圧コンバータのマスター接続部側端子の電圧を検出する第３の電圧センサとをさらに備える。第１、第２の電圧センサの測定可能な上限電圧は、第３の電圧センサの測定可能な上限電圧よりも高い。

【発明の効果】

【0016】

本発明によれば、センサ故障発生時であっても可能な限り走行性能を維持した状態で退避走行をすることが可能となる。

【0017】

また、一旦電源システムを停止させた後にも起動させることが可能となり、退避走行を

中断した後にも再開させることができる。

【発明を実施するための最良の形態】

【００１８】

以下、本発明の実施の形態について図面を参照して詳しく説明する。なお、図中同一または相当部分には同一の符号を付してそれらについての説明は繰返さない。

【００１９】

［車両の全体構成］

図１は、蓄電装置として２つのバッテリを搭載する車両１００の構成を示す回路図である。

【００２０】

図１を参照して、車両１００は、マスター電源部と、スレーブ電源部と、マスター電源部およびスレーブ電源部からの電圧を平滑化させる平滑用コンデンサＣＨと、平滑用コンデンサＣＨの端子間の電圧を検出する電圧センサ１３と、インバータ１４，２２と、エンジン４と、モータジェネレータＭＧ１，ＭＧ２と、動力分割機構３と、車輪２と、制御装置３０とを含む。

【００２１】

マスター電源部は、蓄電用のバッテリＢＭと、バッテリＢＭの切り離しおよび接続を行なう接続部４０Ｍと、接続部４０Ｍを介してバッテリＢＭに接続される電圧コンバータ１２Ｍおよび平滑用コンデンサＣＬＭと、平滑用コンデンサＣＬＭの端子間電圧を検出する電圧センサ２１Ｍと、バッテリＢＭの端子間の電圧ＶＢＭを測定する電圧センサ１０Ｍと、バッテリＢＭに流れる電流ＩＢＭを検知する電流センサ１１Ｍとを含む。バッテリＢＭとしては、たとえば、鉛蓄電池、ニッケル水素電池、リチウムイオン電池等の二次電池を用いることができる。

【００２２】

スレーブ電源部は、蓄電用のバッテリＢＳと、バッテリＢＳの切り離しおよび接続を行なう接続部４０Ｓと、接続部４０Ｓを介してバッテリＢＳに接続される電圧コンバータ１２Ｓおよび平滑用コンデンサＣＬＳと、平滑用コンデンサＣＬＳの端子間電圧を検出する電圧センサ２１Ｓと、バッテリＢＳの端子間の電圧ＶＢＳを測定する電圧センサ１０Ｓと、バッテリＢＳに流れる電流ＩＢＳを検知する電流センサ１１Ｓとを含む。バッテリＢＳとしては、たとえば、鉛蓄電池、ニッケル水素電池、リチウムイオン電池等の二次電池を用いることができる。電圧コンバータ１２Ｓを設けているので、バッテリＢＳは、電圧や容量等の特性がバッテリＢＭとは異なるバッテリを使用することもできる。

【００２３】

平滑用コンデンサＣＬＭは、正極母線ＰＬ１Ｍと負極母線ＳＬ間に接続される。電圧センサ２１Ｍは、平滑用コンデンサＣＬＭの両端部の電圧ＶＬＭを検知して制御装置３０に対して出力する。電圧コンバータ１２Ｍは、平滑用コンデンサＣＬＭの端子間電圧を昇圧する。

【００２４】

平滑用コンデンサＣＬＳは、正極母線ＰＬ１Ｓと負極母線ＳＬ間に接続される。電圧センサ２１Ｓは、平滑用コンデンサＣＬＳの両端部の電圧ＶＬＳを検知して制御装置３０に対して出力する。電圧コンバータ１２Ｓは、平滑用コンデンサＣＬＳの端子間電圧を昇圧する。

【００２５】

平滑用コンデンサＣＨは、電圧コンバータ１２Ｍ，１２Ｓによって昇圧された電圧を平滑化する。電圧センサ１３は、平滑用コンデンサＣＨの端子間電圧ＶＨを検知して制御装置３０に出力する。

【００２６】

インバータ１４は、電圧コンバータ１２Ｓまたは１２Ｍから与えられる直流電圧を三相交流に変換してモータジェネレータＭＧ１に出力する。インバータ２２は、電圧コンバータ１２Ｓまたは１２Ｍから与えられる直流電圧を三相交流に変換してモータジェネレータ

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ＭＧ２に出力する。

【0027】

動力分割機構３は、エンジン４とモータジェネレータＭＧ１，ＭＧ２に結合されてこれらの間で動力を分配する機構である。たとえば動力分割機構としてはサンギヤ、プラネタリキャリヤ、リングギヤの３つの回転軸を有する遊星歯車機構を用いることができる。この３つの回転軸がエンジン４、モータジェネレータＭＧ１，ＭＧ２の各回転軸にそれぞれ接続され，３つの回転軸のうち２つの回転が決定されると他の１軸の回転は強制的に定まる。なおモータジェネレータＭＧ２の回転軸は、図示しない減速ギヤや差動ギヤによって車軸２に結合されている。また動力分割機構３の内部にモータジェネレータＭＧ２の回転軸に対する減速機をさらに組み込んでもよい。

【0028】

接続部４０Ｍは正極母線ＰＬ１Ｍと負極母線ＳＬに接続されている。接続部４０Ｍは、バッテリＢＭの負極と負極母線ＳＬとの間に接続されるシステムメインリレーＳＭＲ３Ｍと，バッテリＢＭの正極と正極母線ＰＬ１Ｍとの間に接続されるシステムメインリレーＳＭＲ２Ｍと，システムメインリレーＳＭＲ２Ｍと並列接続される直列に接続されたシステムメインリレーＳＭＲ１Ｍおよび限流抵抗ＲＭとを含む。システムメインリレーＳＭＲ１Ｍ～ＳＭＲ３Ｍは、制御装置３０から与えられる制御信号ＣＯＮＴに応じて導通／非導通状態が制御される。

【0029】

接続部４０Ｓは正極母線ＰＬ１Ｓと負極母線ＳＬに接続されている。接続部４０Ｓは、バッテリＢＳの負極と負極母線ＳＬとの間に接続されるシステムメインリレーＳＭＲ３Ｓと、バッテリＢＳの正極と正極母線ＰＬ１Ｓとの間に接続されるシステムメインリレーＳＭＲ２Ｓと、システムメインリレーＳＭＲ２Ｓと並列接続される直列に接続されたシステムメインリレーＳＭＲ１Ｓおよび限流抵抗ＲＳとを含む。システムメインリレーＳＭＲ１Ｓ～ＳＭＲ３Ｓは、制御装置３０から与えられる制御信号ＣＯＮＴに応じて導通／非導通状態が制御される。

【0030】

電圧コンバータ１２Ｍは、一方端が正極母線ＰＬ１Ｍに接続されるリアクトルＬ１Ｍと、正極母線ＰＬ２と負極母線ＳＬとの間に直列に接続されるＩＧＢＴ素子Ｑ１Ｍ，Ｑ２Ｍと、ＩＧＢＴ素子Ｑ１Ｍ，Ｑ２Ｍにそれぞれ並列に接続されるダイオードＤ１Ｍ，Ｄ２Ｍとを含む。

【0031】

リアクトルＬ１Ｍの他方端はＩＧＢＴ素子Ｑ１Ｍのエミックおよび ＩＧＢＴ素子Ｑ２Ｍのコレクタに接続される。ダイオードＤ１Ｍのカソードは ＩＧＢＴ素子Ｑ１Ｍのコレクタと接続され，ダイオードＤ１Ｍのアノードは ＩＧＢＴ素子Ｑ１Ｍのエミックと接続される。ダイオードＤ２Ｍのカソードは ＩＧＢＴ素子Ｑ２Ｍのコレクタと接続され、ダイオードＤ２Ｍのアノードは ＩＧＢＴ素子Ｑ２Ｍのエミックと接続される。

【0032】

電圧コンバータ１２Ｓは、一方端が正極母線ＰＬ１Ｓに接続されるリアクトルＬ１Ｓと、正極母線ＰＬ２と負極母線ＳＬとの間に直列に接続されるＩＧＢＴ素子Ｑ１Ｓ，Ｑ２Ｓと、ＩＧＢＴ素子Ｑ１Ｓ，Ｑ２Ｓにそれぞれ並列に接続されるダイオードＤ１Ｓ，Ｄ２Ｓとを含む。

【0033】

リアクトルＬ１Ｓの他方端はＩＧＢＴ素子Ｑ１Ｓのエミックおよび ＩＧＢＴ素子Ｑ２Ｓのコレクタに接続される。ダイオードＤ１Ｓのカソードは ＩＧＢＴ素子Ｑ１Ｓのコレクタと接続され，ダイオードＤ１Ｓのアノードは ＩＧＢＴ素子Ｑ１Ｓのエミックと接続される。ダイオードＤ２Ｓのカソードは ＩＧＢＴ素子Ｑ２Ｓのコレクタと接続され、ダイオードＤ２Ｓのアノードは ＩＧＢＴ素子Ｑ２Ｓのエミックと接続される。

【0034】

インバータ１４は、電圧コンバータ１２Ｍおよび１２Ｓから昇圧された電圧を受けて、

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たとえばエンジン４を始動させるために、モータジェネレータＭＧ１を駆動する。また、インバータ１４は、エンジン４から伝達される機械的動力によってモータジェネレータＭＧ１で発電された電力を電圧コンバータ１２Ｍおよび１２Ｓに戻す。このとき電圧コンバータ１２Ｍおよび１２Ｓは、降圧回路として動作するように制御装置３０によって制御される。

【００３５】

インバータ１４は、Ｕ相アーム１５と、Ｖ相アーム１６と、Ｗ相アーム１７とを含む。Ｕ相アーム１５、Ｖ相アーム１６、およびＷ相アーム１７は、正極母線ＰＬ２と負極母線ＳＬとの間に並列に接続される。

【００３６】

Ｕ相アーム１５は、正極母線ＰＬ２と負極母線ＳＬとの間に直列接続されたＩＧＢＴ素子Ｑ３，Ｑ４と、ＩＧＢＴ素子Ｑ３，Ｑ４とそれぞれ並列に接続されるダイオードＤ３，Ｄ４とを含む。ダイオードＤ３のカソードはＩＧＢＴ素子Ｑ３のコレクタと接続され、ダイオードＤ３のアノードはＩＧＢＴ素子Ｑ３のエミッタと接続される。ダイオードＤ４のカソードはＩＧＢＴ素子Ｑ４のコレクタと接続され、ダイオードＤ４のアノードはＩＧＢＴ素子Ｑ４のエミッタと接続される。

【００３７】

Ｖ相アーム１６は、正極母線ＰＬ２と負極母線ＳＬとの間に直列接続されたＩＧＢＴ素子Ｑ５，Ｑ６と、ＩＧＢＴ素子Ｑ５，Ｑ６とそれぞれ並列に接続されるダイオードＤ５，Ｄ６とを含む。ダイオードＤ５のカソードはＩＧＢＴ素子Ｑ５のコレクタと接続され、ダイオードＤ５のアノードはＩＧＢＴ素子Ｑ５のエミッタと接続される。ダイオードＤ６のカソードはＩＧＢＴ素子Ｑ６のコレクタと接続され、ダイオードＤ６のアノードはＩＧＢＴ素子Ｑ６のエミッタと接続される。

【００３８】

Ｗ相アーム１７は、正極母線ＰＬ２と負極母線ＳＬとの間に直列接続されたＩＧＢＴ素子Ｑ７，Ｑ８と、ＩＧＢＴ素子Ｑ７，Ｑ８とそれぞれ並列に接続されるダイオードＤ７，Ｄ８とを含む。ダイオードＤ７のカソードはＩＧＢＴ素子Ｑ７のコレクタと接続され、ダイオードＤ７のアノードはＩＧＢＴ素子Ｑ７のエミッタと接続される。ダイオードＤ８のカソードはＩＧＢＴ素子Ｑ８のコレクタと接続され、ダイオードＤ８のアノードはＩＧＢＴ素子Ｑ８のエミッタと接続される。

【００３９】

各相アームの中間点は、モータジェネレータＭＧ１の各相コイルの各相端に接続されている。すなわち、モータジェネレータＭＧ１は、三相の永久磁石同期モータであり、Ｕ，Ｖ，Ｗ相の３つのコイルは各々一方端が中点に共に接続されている。そして、Ｕ相コイルの他方端がＩＧＢＴ素子Ｑ３，Ｑ４の接続ノードに接続される。またＶ相コイルの他方端がＩＧＢＴ素子Ｑ５，Ｑ６の接続ノードに接続される。またＷ相コイルの他方端がＩＧＢＴ素子Ｑ７，Ｑ８の接続ノードに接続される。

【００４０】

電流センサ２４は、モータジェネレータＭＧ１に流れる電流をモータ電流値ＭＣＲＴ１として検出し、モータ電流値ＭＣＲＴ１を制御装置３０へ出力する。

【００４１】

インバータ２２は、正極母線ＰＬ２と負極母線ＳＬに接続されている。インバータ２２は車輪２を駆動するモータジェネレータＭＧ２に対して電圧コンバータ１２Ｍおよび１２Ｓの出力する直流電圧を三相交流に変換して出力する。またインバータ２２は、回生制動に伴い、モータジェネレータＭＧ２において発電された電力を電圧コンバータ１２Ｍおよび１２Ｓに戻す。このとき電圧コンバータ１２Ｍおよび１２Ｓは、降圧回路として動作するように制御装置３０によって制御される。インバータ２２の内部の構成は、図示しないがインバータ１４と同様であり、詳細な説明は繰返さない。

【００４２】

電流センサ２５は、モータジェネレータＭＧ２に流れる電流をモータ電流値ＭＣＲＴ２

として検出し、モータ電流値ＭＣＲＴ２を制御装置３０へ出力する。

【0043】

制御装置３０は、トルク指令値ＴＲ１，ＴＲ２、モータ回転数ＭＲＮ１，ＭＲＮ２、電圧ＶＢＭ，ＶＥＳ、ＶＨ、電流ＩＥＭ，ＩＢＳの各値、モータ電流値ＭＣＲＴ１，ＭＣＲＴ２および起動信号ＩＧＯＮを受ける。そして制御装置３０は、電圧コンバータ１２Ｍに対して昇圧指示と降圧指示とを行なう制御信号Ｍ－ＣＰＷＭおよび動作禁止を指示する信号Ｍ－ＣＳＤＮを出力する。また制御装置３０は、電圧コンバータ１２Ｓに対して昇圧指示と降圧指示とを行なう制御信号Ｓ－ＣＰＷＭおよび動作禁止を指示する信号Ｓ－ＣＳＤＮを出力する。

【0044】

さらに、制御装置３０は、インバータ１４に対して電圧コンバータ１２Ｍ，１２Ｓの出力である直流電圧を、モータジェネレータＭＧ１を駆動するための交流電圧に変換する駆動指示ＰＷＭＩ１と、モータジェネレータＭＧ１で発電された交流電圧を直流電圧に変換して電圧コンバータ１２Ｍ，１２Ｓ側に戻す回生指示ＰＷＭＣ１とを出力する。

【0045】

同様に制御装置３０は、インバータ２２に対してモータジェネレータＭＧ２を駆動するための交流電圧に直流電圧を変換する駆動指示ＰＷＭＩ２と、モータジェネレータＭＧ２で発電された交流電圧を直流電圧に変換して電圧コンバータ１２Ｍ，１２Ｓ側に戻す回生指示ＰＷＭＣ２とを出力する。

【0046】

車両１００は、正極母線ＰＬ１Ｍと負極母線ＳＬとに接続されるエアコン５６と、補機用ＤＣ－ＤＣコンバータ５２と、補機用ＤＣ－ＤＣコンバータによって充電される補機バッテリ５４とをさらに含む。

【0047】

制御装置３０やその他の補機には、補機バッテリ５４から電源が供給される。

［実施の形態１］

図１に示した車両では、コンデンサＣＨは、車両起動時には放電されている場合が多い。このような状態でシステムメインリレーを導通されると過大な突入電流が流れてリレーの溶着が発生したり、電力素子が破壊されたりする恐れがある。このため、コンデンサＣＨに対する充電当初は、システムメインリレーを抵抗が高い接続状態にして電流制限を行ない、充電がある程度完了したらシステムメインリレーを抵抗が低い状態に接続し直す、このような充電をプリチャージと呼ぶ。

【0048】

しかし、電圧センサ１３で検出される電圧ＶＨが使用不可である場合には、コンデンサへの充電の完了判定ができないので、システムメインリレーの切換えが行なえず、システムを起動することができない。このため、本実施の形態では、電圧センサ１３の出力値が使用できないばあいでも、他の電圧センサ２１Ｓの検出値を用いてプリチャージを行なわせる。

【0049】

図２は、実施の形態１で実行される車両の電源装置の制御を説明するためのフローチャートである。このフローチャートの処理は、車両の走行制御のメインルーチンから一定時間ごとまたは所定の条件が成立するごとに呼び出されて実行される。

【0050】

図１、図２を参照して、まず、ステップＳ１で運転者がキーやボタンを操作することによりシステム起動信号ＩＧＯＮによる起動指示が与えられたか否かが判断される。起動指示が与えられていなければステップＳ１３に処理が進み、制御はメインルーチンに移される。一方ステップＳ１において起動指示が与えられたことが検出された場合には、その後ステップＳ２において、電圧ＶＨを検出する電圧センサ１３の故障の有無が判断される。

【0051】

ここで電圧センサ１３の故障とは、制御装置３０側でセンサの検出電圧ＶＨが使用でき

ないと判断されることを意味する。

【００５２】

たとえば、制御装置３０が、モータジェネレータ用ＥＣＵ（Electric Control Unit）とハイブリッドシステム用ＥＣＵといったように複数のＥＣＵで実現される場合には、ＥＣＵ間の通信異常やセンサ値を受けるＥＣＵの故障などもステップＳ２でＶＨ故障として検出される。

【００５３】

さらに、電圧センサ１３に繋がれる図示しないセンサ用の電源系の異常や、電圧センサ１３自体の断線異常（接地や電源への短絡）等もステップＳ２でＶＨ故障として検出される。

【００５４】

ステップＳ２でＶＨ故障と判断されない場合（ステップＳ２でＮＯ）には、ステップＳ３に処理が進む。ステップＳ３では電圧センサ１３で検出された電圧ＶＨを電圧コンバータ１２Ｍの電圧制御を行なうためのＶＨ変数に代入される。このＶＨ変数は、コンデンサＣＨのプリチャージ判定にも使用される。

【００５５】

そしてステップＳ４では、システムメインリレーＳＭＲ１Ｍ，ＳＭＲ３Ｍ，ＳＭＲ１Ｓ，ＳＭＲ３Ｓの状態がオフ状態からオン状態に変更される。するとコンデンサＣＬＭ，ＣＬＳとコンデンサＣＨに充電（プリチャージ）が行なわれ、電圧ＶＨが上昇する。この上昇を電圧センサ１３の出力によって制御装置３０が監視し、ステップＳ５でプリチャージが完了したか否かが判断される。電圧ＶＨがしきい値ＶＨ１に到達したらステップＳ５においてプリチャージが完了したと判断されステップＳ６に処理が進む。

【００５６】

ステップＳ６では、システムメインリレーＳＭＲ２Ｍ，ＳＭＲ２Ｓがオフ状態からオン状態に設定され、つぎにステップＳ７でシステムメインリレーＳＭＲ１Ｍ，ＳＭＲ１Ｓがオン状態からオフ状態に設定が変更される。

【００５７】

ステップＳ２でＶＨ故障と判断された場合（ステップＳ２でＹＥＳ）には、ステップＳ３～Ｓ７の処理の代わりにステップＳ８～Ｓ１３の処理が実行される。

【００５８】

ステップＳ８では、スレーブ側の電圧コンバータ１２Ｓが上アームＯＮ状態に設定される。上アームＯＮ状態は、ＩＧＢＴ素子Ｑ１Ｓがオン状態に固定され、ＩＧＢＴ素子Ｑ２Ｓがオフ状態に固定された状態である。電圧コンバータ１２Ｓが上アームＯＮ状態に設定されると、正極母線ＰＬ２の電圧と正極母線ＰＬ１Ｓの電圧とが等しくなる。

【００５９】

起動信号ＩＧＯＮによる起動指示が与えられた直後は、接続部４０Ｍ，４０Ｓは、いずれもオフ状態となっており、バッテリＢＳの電圧は、正極母線ＰＬ１Ｓに与えられていない。したがって、接続部４０Ｓをオフ状態としたまま接続部４０Ｍをオン状態とすれば、正極母線ＰＬ２の電圧が電圧センサ２１Ｓで検出している電圧ＶＬＳと等しくなる。したがって電圧ＶＬＳをコンデンサＣＨのプリチャージ判定や電圧コンバータ１２Ｍの電圧制御に使用することが可能となる。

【００６０】

そこで、ステップＳ８で電圧コンバータ１２Ｓの状態を上アームＯＮ状態に固定した後に、ステップＳ９において、電圧センサ２１Ｓの検出する電圧ＶＬＳが電圧コンバータ１２Ｍの電圧制御を行なうためのＶＨ変数に代入される。このＶＨ変数は、コンデンサＣＨのプリチャージ判定にも使用される。

【００６１】

そしてステップＳ１０では、システムメインリレーＳＭＲ１Ｍ，ＳＭＲ３Ｍの状態がオフ状態からオン状態に変更される。するとコンデンサＣＬＭとコンデンサＣＨに充電（プリチャージ）が行なわれ、電圧ＶＬＳが上昇する。この上昇を電圧センサ２１Ｓの出力に

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よって制御装置３０が監視し、ステップＳ１１でプリチャージが完了したか否かが判断される。電圧ＶＬＳがしきい値ＶＨ１に到達したらステップＳ１１においてプリチャージが完了したと判断されステップＳ１２に処理が進む。

【００６２】

ステップＳ１２では、システムメインリレーＳＭＲ２Ｍの状態がオフ状態からオン状態に変更され、つづいてステップＳ１３でシステムメインリレーＳＭＲ１Ｍの状態がオン状態からオフ状態に変更される。

【００６３】

なお、このとき、システムメインリレーＳＭＲＩＳ，ＳＭＲ２Ｓ，ＳＭＲ３Ｓの状態は、いずれもオフ状態である。

【００６４】

ステップＳ７またはステップＳ１３の処理が終了すると、システム起動完了しステップＳ１４においてＲｅａｄｙＯＮ状態（車両として走行可能な状態）となり、その後ステップＳ１５において、制御は走行制御のメインルーチンに移される。

【００６５】

図３は、ＶＨ正常時すなわち図２のステップＳ３～Ｓ７の処理を経てシステム起動が完了した場合を示した動作波形図である。

【００６６】

図２、図３を参照して、時刻ｔ１で起動信号ＩＧＯＮによる起動指示が入力されると、時刻ｔ１～ｔ３の間に車両の電源装置の自己診断が実行される。この間の時刻ｔ２においてＶＨ正常と診断されると（ステップＳ２でＮＯ）、電圧センサ１３の出力から得られた電圧値がＶＨ変数に代入され、プリチャージ判定に使用される。

【００６７】

そして、時刻ｔ３において、システムメインリレーＳＭＲＩＭ，ＳＭＲ３Ｍ，ＳＭＲ１Ｓ，ＳＭＲ３Ｓの状態がオフ状態からオン状態に変更される。するとコンデンサＣＬＭ，ＣＬＳとコンデンサＣＨに充電（プリチャージ）が行なわれ、電圧ＶＨが上昇する。時刻ｔ３～ｔ４において、電圧センサ１３の出力に基づいて電圧ＶＨの上昇を制御装置３０が監視している。

【００６８】

時刻ｔ４では、電圧ＶＨがしきい値ＶＨ１に到達し、プリチャージが完了したと判断され（ステップＳ３でＹＥＳ）、時刻ｔ５において、システムメインリレーＳＭＲ２Ｍ，ＳＭＲ２Ｓがオフ状態からオン状態に設定され、つづいて時刻ｔ６においてシステムメインリレーＳＭＲ１Ｍ，ＳＭＲＩＳがオン状態からオフ状態に設定が変更され、システム起動が完了しＲｅａｄｙＯＮ状態となる。

【００６９】

ＲｅａｄｙＯＮ状態となった時刻ｔ６以降は、シャットダウン信号Ｍ－ＳＤＮ，Ｓ－ＣＳＤＮによってＩＧＢＴのオンオフスイッチングが禁止されていたのが解除され、電圧コンバータ１２Ｍ，１２Ｓの昇圧が許可される。

【００７０】

図４は、ＶＨ異常時すなわち図２のステップＳ８～Ｓ１３の処理を経てシステム起動が完了した場合を示した動作波形図である。

【００７１】

図２、図４を参照して、時刻ｔ１で起動信号ＩＧＯＮによる起動指示が入力されると、時刻ｔ１～ｔ３の間に車両の電源装置の自己診断が実行される。この間の時刻ｔ２においてＶＨ故障と診断されると（ステップＳ２でＹＥＳ）、スレーブ側の電圧コンバータ１２Ｓの状態は、シャットダウン状態が解除され、上アームＯＮ固定状態に設定される。そして、電圧センサ１３の出力に代えて電圧センサ２１Ｓから得られた電圧値ＶＬＳがＶＨ変数に代入され、プリチャージ判定に使用される。

【００７２】

そして、時刻ｔ３において、システムメインリレーＳＭＲＩＭ，ＳＭＲ３Ｍの状態がオ

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フ状態からオン状態に変更される、するとコンデンサＣＬＭとコンデンサＣＨに充電（プリチャージ）が行なわれ、電圧ＶＬＳが上昇する。時刻ｔ３～ｔ４において電圧ＶＬＳの上昇を電圧センサ２１Ｓの出力を確認することによって制御装置３０が監視している。

【0073】

時刻ｔ４では、電圧ＶＬＳがしきい値ＶＨ１に到達し、プリチャージが完了したと判断され（ステップＳ１１でＹＥＳ）、時刻ｔ５において、システムメインリレーＳＭＲ２Ｍの状態がオフ状態からオン状態に変更され、つづいて時刻ｔ６においてシステムメインリレーＳＭＲ１Ｍの状態がオン状態からオフ状態に変更され、システム起動が完了しＲｅａｄｙＯＮ状態となる。

【0074】

ＲｅａｄｙＯＮ状態となった時刻ｔ６以降は、シャットダウン信号ＭＧＣＳＤＮによってＩＧＢＴのオンオフスイッチングが禁止されていたのが解除され、電圧コンバータ１２Ｍの昇圧が許可される。なお、スレーブ側については、システムメインリレーＳＭＲ１Ｓ、ＳＭＲ２Ｓ、ＳＭＲ３Ｓはオフ状態であり、電圧コンバータ１２Ｓは上アームＯＮ状態に固定されたまま、マスター側のバッテリＢＭ、電圧コンバータ１２Ｍのみによってインバータ１４，２３に対する電源電圧の供給が行われる

【0075】

このように、実施の形態１によれば、車両起動時にＶＨ故障が検出された場合に、電圧コンバータ１２Ｍの機能を停止させずにすみ、車両の走行性能を可能な限り維持しながら、故障を修理する場所まで自力で車両を移動させることが可能である。

【0076】

また、一旦電源システムを停止させた後にも起動させることが可能となり、退避走行を中断した後にも再開させることができる。

【0077】

［実施の形態２］

実施の形態１では、車両起動時の自己診断時に電圧センサ異常が検出された場合のプリチャージ制御やその後の昇圧制御について説明した。加えて電圧センサ異常は車両起動完了後（ＲｅａｄｙＯＮ状態）において検出される場合も考えられる。

【0078】

ＲｅａｄｙＯＮ状態となった後には、図１に示した車両では、モータの回転数やアクセルペダル位置等に基づいて決定される要求駆動力に応じて電圧ＶＨを制御する。このために、制御装置３０は、電圧センサ１３で検出されるＶＨに基づいて電圧コンバータ１２Ｍの制御を行なう。また、スレーブ側の電源部をマスター側と併用するときは、リアクトルＬＩＳに流れる電流を検出して電圧コンバータ１２Ｓを電流制御し、電圧ＶＨを検出してマスター側の電圧コンバータ１２Ｍで電圧制御を行なう。

【0079】

このように電圧センサ１３で検出される電圧ＶＨは、電圧コンバータの目標電圧と実際の出力電圧とを一致させるフィードバック制御を実行するために重要である。しかし、この電圧センサ１３で検出される値が使用できないと判断される場合がある。この場合には、電圧コンバータ１２Ｍを上アームＯＮ状態（ＩＧＢＴ素子Ｑ１Ｍを導通させ、ＩＧＢＴ素子Ｑ２Ｍを非導通とした状態）に制御し、バッテリＢＭの電圧をそのまま正極母線ＰＬ２に出力させればよい。そして、バッテリＢＳは、接続部４０Ｓによってシステムから切り離しておけばよい。このようにすることで、とりあえずの退避走行は可能である。

【0080】

しかし、電圧ＶＨを昇圧しないでバッテリＢＭの電圧そのままとすると、モータジェネレータＭＧ２の回転が高速になって逆起電力が上昇すると制御が困難になるので、高速走行ができなくなり走行性能が落ちる。このため、本実施の形態では、電圧センサ１３の出力値が使用できないばあいでも、他の電圧センサ２１Ｓの検出値を用いて電圧コンバータ１２Ｍに昇圧を行なわせる。

【0081】

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図５は、実施の形態２で実行される故障検出時の処理を説明するためのフローチャートである。このフローチャートの処理は、車両の走行制御のメインルーチンから一定時間ごとまたは所定の条件が成立するごとに呼び出されて実行される。

【００８２】

図１、図５を参照して、まず、ステップＳ５１において、車両の状態が、車両起動が完了している状態（ＲｅａｄｙＯＮ状態）か否かが確認される。ここでのＲｅａｄｙＯＮ状態は、システムが正常状態で、マスター側のシステムメインリレーＳＭＲ２Ｍ、ＳＭＲ３Ｍおよびスレーブ側のシステムメインリレーＳＭＲ２Ｓ、ＳＭＲ３Ｓが接続されており、車両として走行可能状態であることを示す。

【００８３】

ステップＳ５１において、ＲｅａｄｙＯＮ状態でないと判断された場合には、ステップＳ５７に処理が進み、制御はメインルーチンに移される。一方、ステップＳ５１において、ＲｅａｄｙＯＮ状態であると判断された場合には、ステップＳ５２に処理が進む。

【００８４】

ステップＳ５２では、実施の形態１のステップＳ２で実行される故障検出と同じ内容が実行され、加えてさらに、電圧センサ１３の機能異常がチェックされる。機能異常には、たとえばオフセット異常、特性異常、高圧電源線異常が含まれる。

【００８５】

オフセット異常は、電圧センサ１３が電圧ＶＨを正しく変換しない異常である。この場合、一旦電圧コンバータで電圧ＶＨを昇圧後、昇圧機能を停止させ平滑用コンデンサをディスチャージする操作を行なっても電圧センサ１３で検出している電圧ＶＨが低下しないといった現象により異常検出可能である。特性異常は、電圧センサ１３の断線やゲインずれの異常である。高圧電源線異常は、電圧センサ１３のゼロ調等であり、コンデンサＣＨをプリチャージしても電圧が上昇しない。

【００８６】

ステップＳ５２において、ＶＨ故障が検出されない場合には、ステップＳ５７に処理が進み、制御はメインルーチンに移される。一方、ステップＳ５２において、ＶＨ故障が検出された場合には、ステップＳ５３に処理が進む。

【００８７】

ステップＳ５３では、マスター側電圧コンバータ１２Ｍとスレーブ側の電圧コンバータ１２Ｓとにそれぞれ信号Ｍ－ＣＳＤＮ，Ｓ－ＣＳＤＮによってゲート遮断指示が与えられる。また、モータ（モータジェネレータＭＧ２）用インバータ２２および発電機（モータジェネレータＭＧ１）用インバータ１４のＩＧＢＴ素子もゲート遮断状態に制御される。そして、ステップＳ５４においてスレーブ電圧コンバータ１２Ｓ側のシステムメインリレーＳＭＲ２Ｓ、ＳＭＲ３Ｓの状態がＯＮ状態からＯＦＦ状態に変更される。

【００８８】

そしてステップＳ５５において、マスター側電圧コンバータ１２Ｍは信号Ｍ－ＣＳＤＮによってゲート遮断指示が解除され昇圧が許可されるとともに、スレーブ側電圧コンバータ１２Ｓは信号Ｓ－ＣＳＤＮによってゲート遮断指示が解除されるとともに上アームＯＮ状態に制御される。また、モータ（モータジェネレータＭＧ２）用インバータ２２および発電機（モータジェネレータＭＧ１）用インバータ１４のＩＧＢＴ素子もゲート許可状態に制御される。

【００８９】

この状態では、電圧センサ２１Ｓの検出する電圧値ＶＬＳは、電圧センサ１３が検出するはずであった電圧ＶＨとほぼ等しいので、ステップＳ５６において、電圧値ＶＬＳがＶＨ変数に代入される。これにより、電圧コンバータ１２Ｍは出力側の電圧をフィードバック制御することが可能となるので、昇圧動作を再開させることができる。その後ステップＳ５７において、制御は走行制御のメインルーチンに移される。

【００９０】

ここで、電圧センサ２１Ｓを電圧センサ１３の代わりに使用する場合に注意すべき点に

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ついて説明する。

【００９１】

図６は、低圧系の電圧センサの出力特性を示した図である。

図７は、高圧系の電圧センサの出力特性を示した図である。

【００９２】

図６、図７に示した電圧センサの出力電圧は、ＥＣＵの内部でアナログデジタル変換される。たとえば、ＣＰＵに内蔵されたＡ／Ｄコンバータでこの変換がおこなわれる。Ａ／Ｄコンバータの入力レンジは、０～５Ｖ程度である。この入力レンジを１０ビット以上の分解能でＡ／Ｄ変換が実行され、ＣＰＵで電圧値が認識される。

【００９３】

図６に示すように、低圧系センサつまり電圧コンバータで昇圧される前の電圧を検出するセンサは、バッテリ電圧の範囲に多少の余裕をみた入力電圧範囲が０～３３０Ｖ程度でよい。したがって、電圧ＶＬＭを検出する電圧センサ２１Ｍと、電圧ＶＬＳを検出する電圧センサ２１Ｓは、正常動作を実行する限りは、図６のような特性でよい。

【００９４】

そして、昇圧された電圧ＶＨを検出する電圧センサ１３は、入力電圧が０～８００Ｖの範囲を検出可能にしておく必要がある。

【００９５】

しかし、実施の形態２においては、電圧センサ２１Ｓは電圧センサ１３が故障した場合に、電圧コンバータ１２Ｍで昇圧された電圧を検出する必要がある。したがって、実施の形態２においては、少なくとも電圧センサ２１Ｓは電圧センサ１３と同じ図７に示す特性を有する必要がある。そして、その出力をうけるＡ／Ｄコンバータで変換されたデジタル値を検出電圧に変換する際も、図７に基づいて電圧に変更する必要がある。

【００９６】

なお、電圧センサ２１Ｍについては、図６の特性のままでもよいが、図７の特性のものを使用してもよい。

【００９７】

図８は、実施の形態１または２のＲｅａｄｙ　ＯＮ状態となった後のＶＨ正常時の電圧コンバータの制御について説明するための図である。

【００９８】

図８を参照して、ＶＨ正常時では、負荷の使用する電流に合わせてその全部または一部である目標電流Ｉ＊を供給するようにスレーブ側電圧コンバータ１２Ｓでは電流制御が実行される。このとき接続部４０Ｓは接続状態とされバッテリＢＳから電流Ｉ＊に対応する電力が供給されるように制御が行われる。

【００９９】

そして、負荷に与えられる電圧が変動しないように、電圧ＶＨが検出されこれが目標電圧ＶＨ＊に一致するようにマスター側電圧コンバータ１２Ｍでは電圧制御が実行される。

【０１００】

図９は、実施の形態１または２のＲｅａｄｙ　ＯＮ状態となった後のＶＨ故障時の電圧コンバータの制御について説明するための図である。

【０１０１】

図９を参照して、ＶＨ故障時では、スレーブ側電圧コンバータ１２Ｓはエアーム　ＯＮ状態に制御され、接続部４０Ｓはオフ状態に設定されるので、電圧ＶＬＳが電圧ＶＨと等しくなる。そこで電圧ＶＬＳを目標電圧ＶＨ＊に一致させるようにマスター側電圧コンバータ１２Ｍでは電圧制御が実行される。

【０１０２】

このようにすることにより、負荷に高電圧を供給することができるので車両の走行性能を低下させずに済む。

【０１０３】

最後に、以上説明した実施の形態１，２について、図１等を参照しながら総括的に説明

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する。本願実施の形態の車両の電源装置は、第１の蓄電装置（バッテリＢＭ）と、モータを駆動するインバータ１４，２２に給電を行なう電源ライン（正極母線ＰＬ２）と、第１の蓄電装置と電源ラインとの間に設けられ、電圧変換を行なう第１の電圧コンバータ１２Ｍと、第２の蓄電装置（バッテリＢＳ）と、第２の蓄電装置と電源ラインとの間に設けられ、電圧変換を行なう第２の電圧コンバータ１２Ｓと、第２の蓄電装置と第２の電圧コンバータとの間に設けられ、電気的な接続状態の切換えを行なう接続部４０Ｓと、電源ラインの電圧を検出する第１の電圧センサ１３と、第２の電圧コンバータ１２Ｓの接続部側端子の電圧を検出する第２の電圧センサ２１Ｓと、第１、第２の電圧コンバータおよび接続部の制御を行なう制御装置３０とを備える。制御装置３０は、第１の電圧センサ１３の出力が使用不可となる故障を検出した場合には、接続部４０Ｓを非接続状態とし、かつ第２の電圧コンバータ１２Ｓを電圧非変換状態に制御して第２の電圧コンバータ１２Ｓの接続部４０Ｓ側端子に電源ライン（正極母線ＰＬ２）の電圧を出力させ、第１の電圧センサ１３の出力に代えて第２の電圧センサ２１Ｓの出力に基づいて電源ラインの電圧制御を行なう。

【0104】

好ましくは、電源ラインは、正極母線ＰＬ２と、負極母線ＳＬとを含む。車両の電源装置は、正極母線ＰＬ２と負極母線ＳＬとの間に接続される平滑コンデンサＣＨをさらに含む。制御装置３０は、電源ラインの電圧制御の一つとして、平滑コンデンサＣＨに対するプリチャージ制御を行なう。

【0105】

より好ましくは、車両の電源装置は、第１の蓄電装置（バッテリＢＭ）と第１の電圧コンバータ１２Ｍとの間に設けられ、電気的な接続状態を第１の接続状態（ＳＭＲ２Ｍで接続）、第１の接続状態よりも抵抗の高い第２の接続状態（ＳＭＲ１Ｍで接続）および非接続状態の間で切換えを行なうマスター接続部４０Ｍをさらに備える。制御装置３０は、プリチャージ制御において、車両起動指示に応じてマスター接続部４０Ｍを遮断状態から第２の接続状態に切換えて平滑コンデンサＣＨに対するプリチャージを開始させ、その後、第２の電圧センサ２１Ｓの出力に基づいてマスター接続部４０Ｍを第２の接続状態から第１の接続状態に切換える。

【0106】

好ましくは、制御装置３０は、電源ラインの電圧制御の一つとして、第１の電圧コンバータ１２Ｍに対する電圧制御を行なう。

【0107】

より好ましくは、制御装置３０は、第１の電圧センサ１３の出力が使用可能である場合には、第１の電圧センサ１３の出力に基づいて第１の電圧コンバータ１２Ｍを電圧制御するとともに、接続部４０Ｓを接続状態とし第２の電圧コンバータ１２Ｓを通過する電流が目標電流となるように第２の電圧コンバータ１２Ｓを電流制御する。

【0108】

好ましくは、第１の電圧センサ１３と、第２の電圧センサ２１Ｓとは、測定可能入力電圧範囲が等しい。

【0109】

より好ましくは、車両の電源装置は、第１の蓄電装置（バッテリＢＭ）と第１の電圧コンバータ１２Ｍとの間に設けられ、電気的な接続状態の切換えを行なうマスター接続部４０Ｍと、第１の電圧コンバータ１２Ｍのマスター接続部側端子の電圧を検出する第３の電圧センサ２１Ｍとをさらに備える。第１、第２の電圧センサ１３、２１Ｓの測定可能な上限電圧は、第３の電圧センサ２１Ｍの測定可能な上限電圧よりも高い。

【0110】

このような構成および制御とすることで、インバータに高電圧を供給することができるので車両の走行性能を低下させずに済み、また車両の電源システムを停止させた後にも、退避走行を再開させることが可能となる。

【0111】

今回開示された実施の形態はすべての点で例示であって制限的なものではないと考えられるべきである。本発明の範囲は上記した説明ではなくて特許請求の範囲によって示され、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれることが意図される。

【図面の簡単な説明】

【０１１２】

【図１】蓄電装置として２つのバッテリを搭載する車両１００の構成を示す回路図である。

【図２】実施の形態１で実行される車両の電源装置の制御を説明するためのフローチャートである。

【図３】ＶＨ正常時すなわち図２のステップＳ３～Ｓ７の処理を経てシステム起動が完了した場合を示した動作波形図である。

【図４】ＶＨ異常時すなわち図２のステップＳ８～Ｓ１３の処理を経てシステム起動が完了した場合を示した動作波形図である。

【図５】実施の形態２で実行される故障検出時の処理を説明するためのフローチャートである。

【図６】低圧系の電圧センサの出力特性を示した図である。

【図７】高圧系の電圧センサの出力特性を示した図である。

【図８】実施の形態１または２のＲｅａｄｙ　ＯＮ状態となった後のＶＨ正常時の電圧コンバータの制御について説明するための図である。

【図９】実施の形態１または２のＲｅａｄｙ　ＯＮ状態となった後のＶＨ故障時の電圧コンバータの制御について説明するための図である。

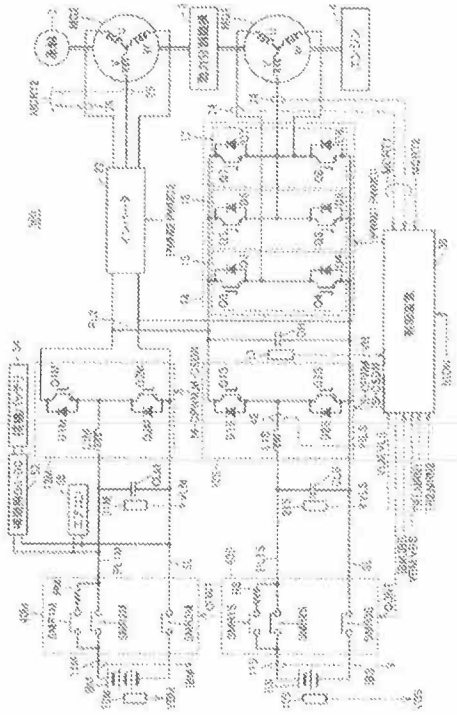
【符号の説明】

【０１１３】

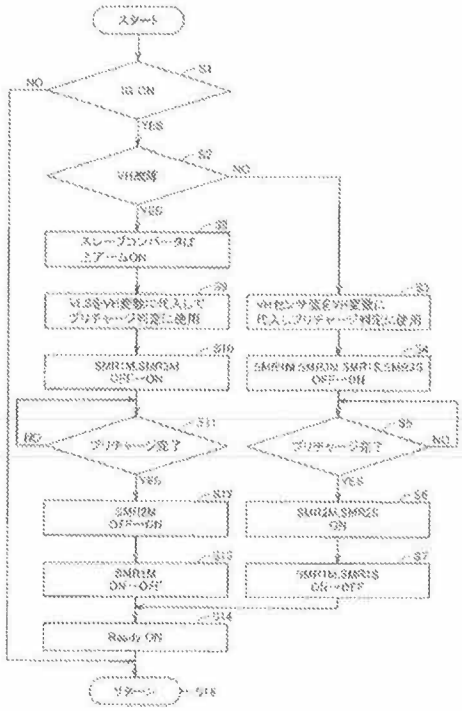
２　車輪、３　動力分割機構、４　エンジン、１０Ｍ，１０Ｓ，１３，２１Ｍ，２１Ｓ　電圧センサ、１１Ｍ，１１Ｓ，２４，２５　電流センサ、１２Ｍ，１２Ｓ　電圧コンバータ、１４，２２　インバータ、１５　Ｕ相アーム、１６　Ｖ相アーム、１７　Ｗ相アーム、３０　制御装置、４０Ｍ，４０Ｓ　接続箱、５２　補機用ＤＣ／ＤＣコンバータ、５４　補機バッテリ、５６　エアコン、１００　車両、ＢＭ，ＢＳ　バッテリ、ＣＨ，ＣＬＭ，ＣＬＳ　平滑用コンデンサ、Ｄ１Ｍ，Ｄ２Ｍ，Ｄ１Ｓ，Ｄ２Ｓ，Ｄ３～Ｄ８　ダイオード、Ｌ１Ｍ，Ｌ１Ｓ　リアクトル、ＭＧ１，ＭＧ２　モータジェネレータ、ＰＬ１Ｍ，ＰＬ１Ｓ，ＰＬ２　正極母線、Ｑ１Ｍ，Ｑ２Ｍ，Ｑ１Ｓ，Ｑ２Ｓ，Ｑ３～Ｑ８　ＩＧＢＴ素子、ＲＭ，ＲＳ　限流抵抗、ＳＬ　負極母線、ＳＭＲ１Ｍ，ＳＭＲ２Ｍ，ＳＭＲ３Ｍ，ＳＭＲ１Ｓ，ＳＭＲ２Ｓ，ＳＭＲ３Ｓ　システムメインリレー。

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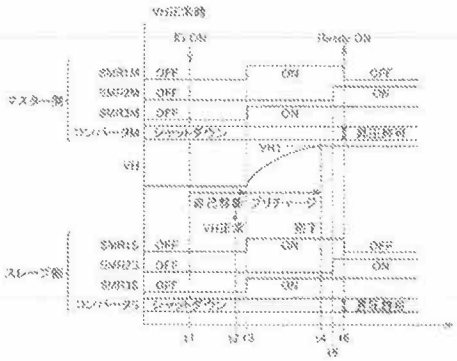
【図1】



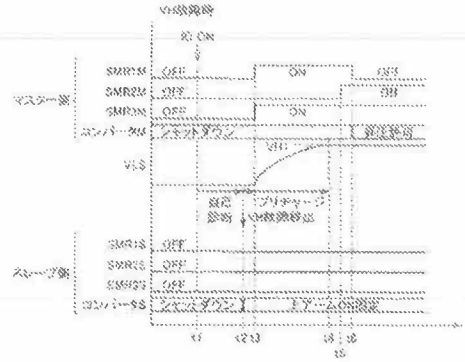
【図2】



【図3】

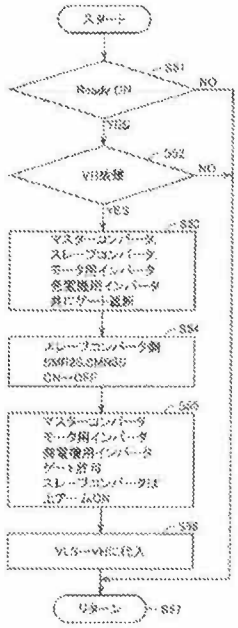


【図4】

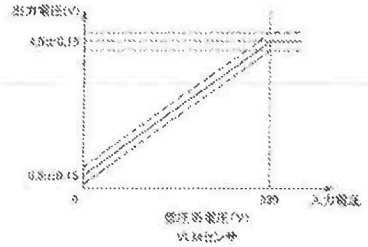


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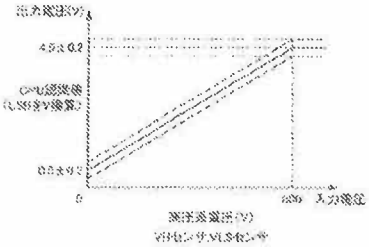
【図５】



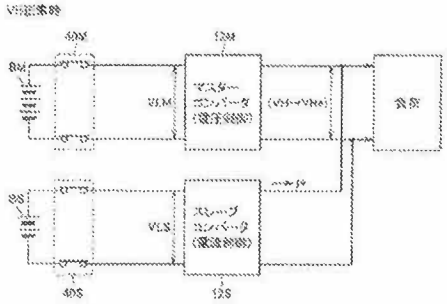
【図６】



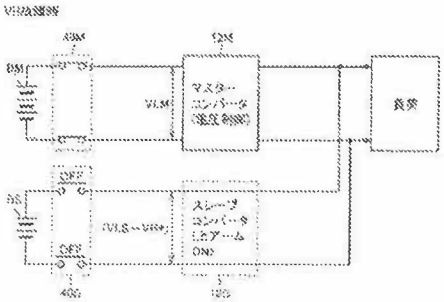
【図７】



【図８】



【図９】



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　　PU24　PU25　PV23　QB20　QB03　SS22　SS03　TD12　TD13　TK06
　　TS04　TZ14

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Espacenet

Bibliographic data: JP2009183108 (A) — 2009-08-13

ELECTRIC VEHICLE, METHOD FOR CONTROLLING ELECTRIC VEHICLE, AND COMPUTER-READABLE RECORDING MEDIUM RECORDING PROGRAM FOR MAKING COMPUTER PERFORM THE SAME CONTROL METHOD

Inventor(s): HANADA HIDETO; YAMADA KATASHIGE; KATO AKIRA; SAIDA HIDEAKI ± (HANADA HIDETO, ; YAMADA KATASHIGE, ; KATO AKIRA, ; SAIDA HIDEAKI)

Applicant(s): TOYOTA MOTOR CORP ± (TOYOTA MOTOR CORP)

Classification: - international: ***B60K6/445; B60L11/18; B60L15/20; B60L3/00; B60W10/26; B60W20/00; H02M3/155***
- cooperative: Y02T10/6239; Y02T10/7005; Y02T10/7275

Application number: JP20080021404 20080131 Global Dossier

Priority number (s): JP20080021404 20080131

Also published as: JP4840374 (B2)

Abstract of JP2009183108 (A)

PROBLEM TO BE SOLVED: To control the input/output power of a power storage device within a limit value, even if the number of rotations of a motor is suddenly changed in an electric vehicle equipped with a power supply that includes a plurality of power storage devices. ;SOLUTION: The power supply part 1 includes the power storage devices 6-1, 6-2, and the converters 8-1, 8-2. The converters 8-1, 8-2 are connected in parallel with each other to a main positive busbar MPL and a main negative busbar MNL. The converter 8-1 is voltage-controlled so that a voltage Vh becomes a target voltage. The converter 8-2 is voltage-controlled so that charge/discharge power of the power storage device 6-2 become the target power. In an HV-ECU3, power demanded, with respect to a driving force generation part 2, is limited to a value obtained by adding the charge/discharge power of the power storage device 6-2 to a power limit value, with respect to the power storage device 6-1. ;COPYRIGHT: (C)2009,JPO&INPIT

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B60L	15/20	(2006.01)	B60L	15/20	S	
B60K	6/445	(2007.10)	B60L	15/20	Y	
B60W	10/26	(2006.01)	B60K	6/445		

審査請求 未請求　請求項の数 7　OL　（全 19 頁）　最終頁に続く

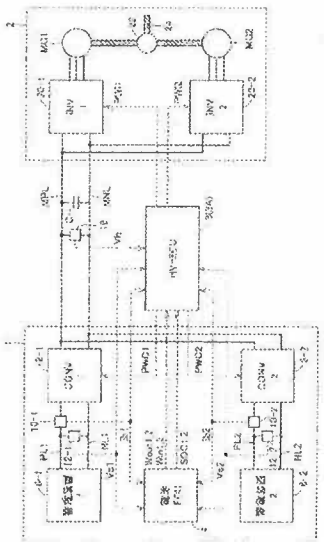
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最終頁に続く

(54)【発明の名称】電動車両、電動車両の制御方法およびその制御方法をコンピュータに実行させるためのプログラムを記録したコンピュータ読取可能な記録媒体

(57)【要約】
【課題】複数の蓄電装置を含む電源部を備えた電動車両において、電動機の回転数が急変しても蓄電装置の入出力パワーを制限値内に制御可能とする。
【解決手段】電源部1は、蓄電装置6－1，6－2と、コンバータ8－1，8－2とを含む。コンバータ8－1，8－2は、主正母線MPLおよび主負母線MNLに互いに並列して接続される。コンバータ8－1は、電圧Vhが目標電圧となるように電圧制御される。コンバータ8－2は、蓄電装置6－2の充放電電力が目標電力となるように電力制御される。HV－ECU3は、蓄電装置6－1に対する電力制限値に蓄電装置6－2の充放電電力を加えた値に、駆動力発生部2に対する要求パワーを制限する。
【選択図】図1



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【特許請求の範囲】
【請求項1】
電動機によって車両の駆動力を発生可能に構成された駆動力発生部と、
前記駆動力発生部と電力線を介して電力を授受可能な電源部と、
前記駆動力発生部および前記電源部を制御する制御部とを備え、
前記電源部は、
充放電可能な第１および第２の蓄電装置と、
前記第１の蓄電装置と前記電力線との間に設けられる第１のコンバータと、
前記第２の蓄電装置と前記電力線との間に設けられる第２のコンバータとを含み、
前記制御部は、
前記駆動力発生部に対する要求パワーを算出するパワー算出部と、
前記電力線の電圧が所定の目標電圧となるように前記第１のコンバータを制御する電圧制御部と、
前記第２の蓄電装置の充放電電力が所定の目標電力となるように前記第２のコンバータを制御する電力制御部と、
前記第１の蓄電装置に対する電力制限値に前記第２の蓄電装置の充放電電力を加えた値に、前記要求パワーを制限するパワー制限制御部とを含む、電動車両。
【請求項2】
前記制御部は、前記駆動力発生部の出力回転数が急変したか否かを判定する判定部をさらに備え、
前記電力制御部は、前記判定部により前記出力回転数が急変したと判定されたとき、前記第２の蓄電装置の充放電電力が略零となるように前記第２のコンバータを制御する、請求項１に記載の電動車両。
【請求項3】
前記電力制御部は、前記第２の蓄電装置の充放電電力が前記目標電力となるように前記第２のコンバータの電流を制御する、請求項１または請求項２に記載の電動車両。
【請求項4】
電動車両の制御方法であって、
前記電動車両は、
電動機によって車両の駆動力を発生可能に構成された駆動力発生部と、
前記駆動力発生部と電力線を介して電力を授受可能な電源部とを備え、
前記電源部は、
充放電可能な第１および第２の蓄電装置と、
前記第１の蓄電装置と前記電力線との間に設けられる第１のコンバータと、
前記第２の蓄電装置と前記電力線との間に設けられる第２のコンバータとを含み、
前記制御方法は、
前記駆動力発生部に対する要求パワーを算出するステップと、
前記電力線の電圧が所定の目標電圧となるように前記第１のコンバータを制御するステップと、
前記第２の蓄電装置の充放電電力が所定の目標電力となるように前記第２のコンバータを制御するステップと、
前記第１の蓄電装置に対する電力制限値に前記第２の蓄電装置の充放電電力を加えた値に、前記要求パワーを制限するステップとを含む、電動車両の制御方法。
【請求項5】
前記駆動力発生部の出力回転数が急変したか否かを判定するステップをさらに含み、
前記出力回転数が急変したと判定されたとき、前記第２のコンバータを制御するステップにおいて、前記第２の蓄電装置の充放電電力が略零となるように前記第２のコンバータが制御される、請求項４に記載の電動車両の制御方法。
【請求項6】

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前記第２のコンバータを制御するステップにおいて、前記第２の蓄電装置の充放電電力が前記目標電力となるように前記第２のコンバータの電流が制御される、請求項４または請求項５に記載の電動車両の制御方法。

【請求項７】

請求項４から請求項６のいずれか１項に記載の電動車両の制御方法をコンピュータに実行させるプログラムを記録したコンピュータ読取可能な記録媒体。

【発明の詳細な説明】

【技術分野】

【０００１】

この発明は、複数の蓄電装置を含む電源部を備えた電動車両の電力制御に関する。

【背景技術】

【０００２】

昨今、ハイブリッド自動車（Hybrid Vehicle）や電気自動車（Electric Vehicle）など動力源として電動機を搭載する電動車両が注目されている。これらの電動車両においては、加速性能や走行持続距離などの走行性能を高めるために、電源部の大容量化の開発が進められている。そして、電源部を大容量化するための手段として、複数の蓄電装置と複数のコンバータとを有する構成が提案されている。

【０００３】

たとえば、ディ・ナポリらの「ハイブリッド車両におけるパワーフローマネジメントのための多入力ＤＣ－ＤＣパワーコンバータ」には、複数の蓄電装置としてキャパシタおよびバッテリを備え、キャパシタおよびバッテリの各々に対応するＤＣ－ＤＣコンバータを備えた電源装置の構成が開示されている。そして、このディ・ナポリらでは、キャパシタに対応するコンバータを電流制御（電力制御）し、バッテリに対応するコンバータを電圧制御することが開示されている（非特許文献１参照）。

【特許文献1】特開２００５－５１８５０号公報

【非特許文献1】ディ・ナポリ（Di Napoli, A）他４名、「ハイブリッド車両におけるパワーフローマネジメントのための多入力ＤＣ－ＤＣパワーコンバータ（Multiple-Input DC-DC Power Converter for Power-Flow Management in Hybrid Vehicles）」、（米国）、２００２年産業応用会議・第３７回ＩＡＳ年次集会・２００２年米国電気電子学会会議録（Industry Applications Conference, 2002. 37th IAS Annual Meeting. Conference Record of the 2002 IEEE）、２００２年、ｖｏｌ．３，ｐ．１５７８－１５８５

【発明の開示】

【発明が解決しようとする課題】

【０００４】

電動車両において、氷結路における駆動輪のスリップ発生時や、波状路において駆動輪が跳ね上がったときの駆動輪の空転時などは、駆動輪の回転数が急増し、電動機の出力が一時的に急増する。このため、電源部から電動機へ一時的に大電力が供給される。

【０００５】

一方、複数の蓄電装置を備えた電動車両においては、特定の蓄電装置に負荷が集中しないように、一般的には、複数の蓄電装置の充放電電力が均等になるようにパワー配分が行なわれる。

【０００６】

ここで、上記のディ・ナポリらに開示された電源装置のように、ＤＣリンクに並列接続された複数のコンバータの一方を電圧制御し他方を電流制御（電力制御）する場合、以下の理由により、スリップ発生時や波状路における駆動輪の空転時などに、電圧制御側のコンバータに対応する蓄電装置（ディ・ナポリらにおいてはバッテリ）の出力パワーが上限を超え得る。

【０００７】

すなわち、スリップ発生時に電動機の出力が一時的に急増しても、回転数取込の際のフィルタ処理や信号伝達の遅延等により出力変動の認識遅れが発生し、その結果、電動機の出力が実際には急増しているにも拘わらず複数の蓄電装置間でのパワー配分の変更に遅れ

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が発生する状況が発生する。このとき、電流制御（電力制御）側のコンバータは、スリップ等による出力急増前の状態に基づいて電流制御（電力制御）を行なうため、電圧制御側のコンバータに対応する蓄電装置のみで出力増加分を負担する状況が発生し、その蓄電装置の出力パワーが上限を超え得る。

【0008】

また、反対に、スリップ状態や空転状態からグリップ状態になると、駆動輪の回転数が急減し、電動機の出力が一時的に急減する。そうすると、エンジンなどを用いた発電装置により発電が行なわれている場合、スリップや空転発生時と同様の出力変動の認識遅れにより、今度は蓄電装置の入力パワー（充電パワー）が上限を超え得る。

【0009】

そこで、この発明は、かかる問題を解決するためになされたものであり、その目的は、電動機の回転数が急変しても蓄電装置の入出力パワーを制限値内に制御可能な電動車両を提供することである。

【0010】

また、この発明の別の目的は、電動機の回転数が急変しても蓄電装置の入出力パワーを制限値内に制御可能な電動車両の制御方法およびその制御方法をコンピュータに実行させるためのプログラムを記録したコンピュータ読取可能な記録媒体を提供することである。

【課題を解決するための手段】

【0011】

この発明によれば、電動車両は、駆動力発生部と、電源部と、制御部とを備える。駆動力発生部は、電動機によって車両の駆動力を発生可能に構成される。電源部は、駆動力発生部と電力線を介して電力を授受可能である。制御部は、駆動力発生部および電源部を制御する。電源部は、充放電可能な第１および第２の蓄電装置と、第１および第２のコンバータとを含む。第１のコンバータは、第１の蓄電装置と電力線との間に設けられる。第２のコンバータは、第２の蓄電装置と電力線との間に設けられる。制御部は、パワー算出部と、電圧制御部と、電力制御部と、パワー制限制御部とを含む。パワー算出部は、駆動力発生部に対する要求パワーを算出する。電圧制御部は、電力線の電圧が所定の目標電圧となるように第１のコンバータを制御する。電力制御部は、第２の蓄電装置の充放電電力が所定の目標電力となるように第２のコンバータを制御する。パワー制限制御部は、第１の蓄電装置に対する電力制限値に第２の蓄電装置の充放電電力を加えた値に、駆動力発生部に対する要求パワーを制限する。

【0012】

好ましくは、制御部は、駆動力発生部の出力回転数が急変したか否かを判定する判定部をさらに備える。電力制御部は、判定部により出力回転数が急変したと判定されたとき、第２の蓄電装置の充放電電力が略零となるように第２のコンバータを制御する。

【0013】

好ましくは、電力制御部は、第２の蓄電装置の充放電電力が目標電力となるように第２のコンバータの電流を制御する。

【0014】

また、この発明によれば、制御方法は、電動車両の制御方法である。電動車両は、駆動力発生部と、電源部とを備える。駆動力発生部は、電動機によって車両の駆動力を発生可能に構成される。電源部は、駆動力発生部と電力線を介して電力を授受可能である。電源部は、充放電可能な第１および第２の蓄電装置と、第１および第２のコンバータとを含む。第１のコンバータは、第１の蓄電装置と電力線との間に設けられる。第２のコンバータは、第２の蓄電装置と電力線との間に設けられる。制御方法は、駆動力発生部に対する要求パワーを算出するステップと、電力線の電圧が所定の目標電圧となるように第１のコンバータを制御するステップと、第２の蓄電装置の充放電電力が所定の目標電力となるように第２のコンバータを制御するステップと、第１の蓄電装置に対する電力制限値に第２の蓄電装置の充放電電力を加えた値に、駆動力発生部に対する要求パワーを制限するステップとを含む。

【0015】
好ましくは、制御方法は、駆動力発生部の出力回転数が急変したか否かを判定するステップをさらに含む。そして、出力回転数が急変したと判定されたとき、第２のコンバータを制御するステップにおいて、第２の蓄電装置の充放電電力が略零となるように第２のコンバータが制御される。
【0016】
好ましくは、第２のコンバータを制御するステップにおいて、第２の蓄電装置の充放電電力が目標電力となるように第２のコンバータの電流が制御される。
【0017】
また、この発明によれば、記録媒体は、コンピュータ読取可能な記録媒体であって、上述したいずれかの電動車両の制御方法をコンピュータに実行させるためのプログラムを記録する。
【発明の効果】
【0018】
この発明においては、第１および第２のコンバータが互いに並列して電力線に接続される。第１のコンバータは、電力線の電圧が所定の目標電圧となるように電圧制御される。第２のコンバータは、第２の蓄電装置の充放電電力が所定の目標電力となるように電力制御（電流制御）される。そして、パワー制限制御部は、第１の蓄電装置に対する電力制限値に第２の蓄電装置の充放電電力を加えた値に、駆動力発生部に対する要求パワーを制限するので、第１の蓄電装置の充放電電力が第１の蓄電装置に対する電力制限値を超えることはない。
【0019】
したがって、この発明によれば、電動機の回転数が急変しても蓄電装置の入出力パワーを制限値内に制御することができる。
【発明を実施するための最良の形態】
【0020】
以下、本発明の実施の形態について、図面を参照しながら詳細に説明する。なお、図中同一または相当部分には同一符号を付してその説明は繰返さない。
【0021】
［実施の形態１］
図１は、この発明の実施の形態１による電動車両の全体ブロック図である。図１を参照して、電動車両１００は、電源部１と、駆動力発生部２と、ＨＶ－ＥＣＵ（Electronic Control Unit）３と、主正母線ＭＰＬと、主負母線ＭＮＬと、コンデンサＣと、電圧センサ１８とを備える。
【0022】
電源部１は、蓄電装置６－１，６－２と、コンバータ８－１，８－２と、電池ＥＣＵ４と、電流センサ１０－１，１０－２と、電圧センサ１２－１，１２－２とを含む。
【0023】
蓄電装置６－１，６－２は、充放電可能な直流電源であり、たとえば、リチウムイオン電池やニッケル水素電池などの二次電池から成る。蓄電装置６－１は、正極線ＰＬ１および負極線ＮＬ１を介してコンバータ８－１に接続される。蓄電装置６－２は、正極線ＰＬ２および負極線ＮＬ２を介してコンバータ８－２に接続される。なお、蓄電装置６－１，６－２の少なくとも一方を電気二重層キャパシタで構成してもよい。
【0024】
コンバータ８－１は、蓄電装置６－１と主正母線ＭＰＬおよび主負母線ＭＮＬとの間に設けられ、ＨＶ－ＥＣＵ３からの駆動信号ＰＷＣ１に基づいて、蓄電装置６－１と主正母線ＭＰＬおよび主負母線ＭＮＬとの間で電圧変換を行なう。コンバータ８－２は、蓄電装置６－２と主正母線ＭＰＬおよび主負母線ＭＮＬとの間に設けられ、ＨＶ－ＥＣＵ３からの駆動信号ＰＷＣ２に基づいて、蓄電装置６－２と主正母線ＭＰＬおよび主負母線ＭＮＬとの間で電圧変換を行なう。すなわち、コンバータ８－１，８－２は、主正母線ＭＰＬお

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および主負母線ＭＮＬに互いに並列して接続される。

【0025】

電流センサ１０－１は、蓄電装置６－１に対して入出力される電流Ｉｂ１を検出し、その検出値を電池ＥＣＵ４およびＨＶ－ＥＣＵ３へ出力する。電流センサ１０－２は、蓄電装置６－２に対して入出力される電流Ｉｂ２を検出し、その検出値を電池ＥＣＵ４およびＨＶ－ＥＣＵ３へ出力する。なお、電流センサ１０－１，１０－２は、対応の蓄電装置から出力される電流（放電電流）を正値として検出し、対応の蓄電装置に入力される電流（充電電流）を負値として検出する。なお、図１では、電流センサ１０－１，１０－２がそれぞれ正極線ＰＬ１，ＰＬ２の電流を検出する場合が示されているが、電流センサ１０－１，１０－２は、それぞれ負極線ＮＬ１，ＮＬ２の電流を検出してもよい。

【0026】

電圧センサ１２－１は、正極線ＰＬ１と負極線ＮＬ１との間の電圧すなわち蓄電装置６－１の電圧Ｖｂ１を検出し、その検出値を電池ＥＣＵ４およびＨＶ－ＥＣＵ３へ出力する。電圧センサ１２－２は、正極線ＰＬ２と負極線ＮＬ２との間の電圧すなわち蓄電装置６－２の電圧Ｖｂ２を検出し、その検出値を電池ＥＣＵ４およびＨＶ－ＥＣＵ３へ出力する。

【0027】

電池ＥＣＵ４は、電流センサ１０－１からの電流Ｉｂ１の検出値と電圧センサ１２－１からの電圧Ｖｂ１の検出値とに基づいて蓄電装置６－１の充電状態（以下「ＳＯＣ（State of Charge）」とも称する。）を示す状態量ＳＯＣ１を算出する。また、電池ＥＣＵ４は、電流センサ１０－２からの電流Ｉｂ２の検出値と電圧センサ１２－２からの電圧Ｖｂ２の検出値とに基づいて蓄電装置６－２のＳＯＣを示す状態量ＳＯＣ２を算出する。

【0028】

そして、電池ＥＣＵ４は、その算出した状態量ＳＯＣ１，ＳＯＣ２をＨＶ－ＥＣＵ３へ出力する。また、電池ＥＣＵ４は、蓄電装置６－１，６－２の放電電力の上限を示す放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２および蓄電装置６－１，６－２の充電電力の上限を示す充電電力上限値Ｗｉｎ１，Ｗｉｎ２をＨＶ－ＥＣＵ３へ出力する。

【0029】

駆動力発生部２は、インバータ２０－１，２０－２と、モータジェネレータＭＧ１，ＭＧ２と、動力伝達機構２２と、駆動軸２４とを備える。

【0030】

インバータ２０－１，２０－２は、主正母線ＭＰＬおよび主負母線ＭＮＬに互いに並列して接続される。そして、インバータ２０－１，２０－２は、主正母線ＭＰＬおよび主負母線ＭＮＬから供給される駆動電力（直流電力）を交流電力に変換してそれぞれモータジェネレータＭＧ１，ＭＧ２へ出力する。また、インバータ２０－１，２０－２は、それぞれモータジェネレータＭＧ１，ＭＧ２が発電する交流電力を直流電力に変換して回生電力として主正母線ＭＰＬおよび主負母線ＭＮＬへ出力する。

【0031】

モータジェネレータＭＧ１，ＭＧ２は、それぞれインバータ２０－１，２０－２から供給される交流電力を受けて回転駆動力を発生する。また、モータジェネレータＭＧ１，ＭＧ２は、外部から回転力を受けて交流電力を発生する。モータジェネレータＭＧ１，ＭＧ２は、たとえば、永久磁石が埋設されたロータとＹ結線された三相コイルを有するステータとを備える三相交流回転電機から成る。そして、モータジェネレータＭＧ１，ＭＧ２は、動力伝達機構２２と連結され、動力伝達機構２２にさらに連結される駆動軸２４を介して回転駆動力が車輪（図示せず）へ伝達される。

【0032】

なお、この電動車両１００がハイブリッド車両の場合には、モータジェネレータＭＧ１，ＭＧ２は、動力伝達機構２２または駆動軸２４を介してエンジン（図示せず）にも連結される。そして、ＨＶ－ＥＣＵ３によって、エンジンの発生する駆動力とモータジェネレータＭＧ１，ＭＧ２の発生する駆動力とが最適な比率となるように制御が実行される。な

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お、モータジェネレータＭＧ１，ＭＧ２のいずれか一方を専ら電動機として機能させ、他方のモータジェネレータを専ら発電機として機能させてもよい。

【0033】

コンデンサＣは、主正母線ＭＰＬと主負母線ＭＮＬとの間に接続され、主正母線ＭＰＬおよび主負母線ＭＮＬに含まれる電力変動成分を低減する。電圧センサ１８は、主正母線ＭＰＬと主負母線ＭＮＬとの間の電圧Ｖｈを検出し、その検出値をＨＶ－ＥＣＵ３へ出力する。

【0034】

ＨＶ－ＥＣＵ３は、車両の走行状況やアクセル開度、蓄電装置６－１，６－２のＳＯＣなどに基づいて、駆動力発生部２に対する要求パワーを算出する。そして、ＨＶ－ＥＣＵ３は、その算出された要求パワーに基づいて、モータジェネレータＭＧ１，ＭＧ２をそれぞれ駆動するための駆動信号ＰＷＩ１，ＰＷＩ２を生成し、その生成された駆動信号ＰＷＩ１，ＰＷＩ２をそれぞれインバータ２０－１，２０－２へ出力する。

【0035】

また、ＨＶ－ＥＣＵ３は、上記の要求パワーに基づいて、コンバータ８－１，８－２をそれぞれ駆動するための駆動信号ＰＷＣ１，ＰＷＣ２を生成し、その生成された駆動信号ＰＷＣ１，ＰＷＣ２をそれぞれコンバータ８－１，８－２へ出力する。

【0036】

ここで、ＨＶ－ＥＣＵ３は、上記の要求パワーに基づいて、蓄電装置６－１，６－２のパワー配分制御を実行する。たとえば、ＨＶ－ＥＣＵ３は、要求パワーを蓄電装置６－１，６－２で均等に負担するように蓄電装置６－１，６－２のパワー配分を決定する。

【0037】

そして、ＨＶ－ＥＣＵ３は、コンバータ８－２については、蓄電装置６－２の充放電電力が上記のパワー配分により決定された電力（目標電力）となるように、コンバータ８－２を駆動するための駆動信号ＰＷＣ２を生成する。また、コンバータ８－１については、ＨＶ－ＥＣＵ３は、主正母線ＭＰＬと主負母線ＭＮＬとの間の電圧Ｖｈが所定の目標電圧となるように、コンバータ８－１を駆動するための駆動信号ＰＷＣ１を生成する。

【0038】

また、ＨＶ－ＥＣＵ３は、駆動輪のスリップ発生時やスリップ状態からのグリップ時等に駆動輪の回転数が急変しても、蓄電装置６－１の充放電電力が上下限値を超えず、かつ、蓄電装置６－２の充放電電力も上下限値を超えないように、後述の方法によりパワー制限制御を実行する。

【0039】

図２は、図１に示したＨＶ－ＥＣＵ３によるパワー制限制御の考え方を説明するための図である。図２を参照して，Ｐｏは，駆動力発生部２が発生するパワーを示し、Ｐｂ１，Ｐｂ２は、それぞれ蓄電装置６－１，６－２の充放電電力を示す。なお、以下では，駆動力発生部２が電源部１から電力の供給を受けて車両の駆動力を発生するときのパワーＰｏを正とし、車両の運動エネルギーやエンジン出力を用いて駆動力発生部２が回生発電するときのパワーＰｏを負とする。また，蓄電装置６－１，６－２の放電時の充放電電力Ｐｂ１，Ｐｂ２を正とし、充電時の充放電電力Ｐｂ１，Ｐｂ２を負とする。

【0040】

そして、この図２では、駆動輪のスリップ発生により駆動輪の回転数が急増する場合のパワー制限制御の考え方について説明されるが、スリップ状態からグリップすることにより駆動輪の回転数が急減する場合のパワー制限制御の考え方についても同様に考えることができる。

【0041】

図２において、上段は、スリップ発生前のパワーＰｏおよび蓄電装置６－１，６－２の充放電電力Ｐｂ１，Ｐｂ２を示し、下段は、スリップ直後のパワーＰｏおよび蓄電装置６－１，６－２の充放電電力Ｐｂ１，Ｐｂ２を示す。なお、比較のため、この実施の形態１におけるパワー制限制御が行なわれなかった場合（従来相当）のスリップ直後のパワーＰ

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ｏおよび蓄電装置６－１，６－２の充放電電力Ｐｂ１，Ｐｂ２を図の中段に示す。なお，以下の説明では，放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２は互いに同じ値とするが，放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２は互いに異なる値であってもよい。

【００４２】

スリップ発生前，駆動力発生部２のパワーＰｏを蓄電装置６－１，６－２で均等に負担するように蓄電装置６－１，６－２間でパワーが分配され，充放電電力Ｐｂ１，Ｐｂ２は，それぞれ放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２を下回っている。

【００４３】

ここで，駆動輪のスリップが発生すると，駆動輪の回転数の急増に伴ないパワーＰｏが急増する。従来，パワーＰｏの上限値は，放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２の和に設定されており，放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２の和をパワーＰｏが超えないように駆動力発生部２の出力が制限される（図２中段）。

【００４４】

ところで，駆動輪のスリップにより実際のパワーＰｏは上昇しているのに対し，電動機回転数の取込時におけるフィルタ処理や信号伝達の遅延等により，ＨＶ－ＥＣＵ３において出力変動の認識遅れが発生する。そして，この遅れにより蓄電装置６－１，６－２間のパワー配分制御に遅れが生じ，パワーＰｏは上昇しているにも拘わらず，電力制御される蓄電装置６－２の電力指令に反映されないという状況が一時的に発生する。この間，パワーＰｏの上昇分は，電圧制御されるコンバータ８－１に対応する蓄電装置６－１で負担することになり，従来，蓄電装置６－１の放電電力Ｐｂ１が蓄電装置６－１の放電電力上限値Ｗｏｕｔ１を超えてしまうという問題が生じていた（図２中段）。

【００４５】

そこで，この実施の形態１では，駆動力発生部２のパワーＰｏの上限値を，蓄電装置６－１，６－２の放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２の和とするのではなく，蓄電装置６－１の放電電力上限値Ｗｏｕｔ１に蓄電装置６－２の現在の放電電力（制御目標値であってもよいし実績値であってもよい。）を加えた値とすることとしたものである。これにより，スリップ直後に駆動力発生部２のパワーＰｏが上昇したにも拘わらず蓄電装置６－１，６－２間のパワー配分制御に反映されない状況が一時的に発生しても，電力制御されない蓄電装置６－１の放電電力Ｐｂ１も放電電力上限値Ｗｏｕｔ１内に抑えることが可能となる（図２下段）。

【００４６】

図３，４は，スリップ発生時における蓄電装置６－１，６－２の充放電電力Ｐｂ１，Ｐｂ２の時間的推移を示した図である。比較のため，上述したこの実施の形態１におけるパワー制限制御が適用されない場合（従来相当）の推移を図３に示し，実施の形態１を適用した場合の推移を図４に示す。

【００４７】

図３を参照して，時刻ｔ１において駆動輪のスリップが発生したものとする。スリップの発生に伴ない，駆動力発生部２の出力回転数が上昇する。ここで，上述のように，検出される回転数のフィルタ処理や信号の伝達遅れ等により，蓄電装置６－１，６－２間のパワー配分制御に遅れが発生し，時刻ｔ１よりも遅れた時刻ｔ２において，スリップによる出力急増がパワー配分制御に反映されることにより，蓄電装置６－２の放電電力Ｐｂ２が上昇し始める。

【００４８】

ここで，駆動力発生部２のパワー上限値ＬＭＴは，蓄電装置６－１，６－２の放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２の和で規定されているため，対応のコンバータ８－１によって直接電力制御されない蓄電装置６－１の放電電力の上限は，実質的には一転鎖線で示される値（Ｗｏｕｔ１＋Ｗｏｕｔ２－Ｐｂ２）となっており，放電電力上限値Ｗｏｕｔ１を超えるものとなっていた。そして，上述したようなパワー配分制御の遅れに起因して，蓄電装置６－１の放電電力Ｐｂ１が放電電力上限値Ｗｏｕｔ１を越える状況が発生していた。

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【0049】
一方、図４を参照して、この実施の形態１では、駆動力発生部２のパワー上限値ＬＭＴは、蓄電装置６－１の放電電力上限値Ｗｏｕｔ１に蓄電装置６－２の充放電電力Ｐｂ２を加えた値に設定される。これにより、駆動力発生部２のパワーＰｏをパワー上限値ＬＭＴ内に抑えることによって蓄電装置６－１の放電電力Ｐｂ１を一転鎖線で示される放電電力上限値Ｗｏｕｔ１内に間接的に抑えることが可能となり、上述したようなパワー配分制御に遅れが発生しても、蓄電装置６－１の放電電力Ｐｂ１が放電電力上限値Ｗｏｕｔ１を越えることはない。
【0050】
次に、ＨＶ－ＥＣＵ３の構成について詳しく説明する。図５は、図１に示したＨＶ－ＥＣＵ３の機能ブロック図である。図５を参照して、ＨＶ－ＥＣＵ３は、コンバータ制御部３１と、駆動制御部３２とを含む。
【0051】
コンバータ制御部３１は、電池ＥＣＵ４（図１）から蓄電装置６－１，６－２の放電電力上限値Ｗｏｕｔ１，Ｗｏｕｔ２および充電電力上限値Ｗｉｎ１，Ｗｉｎ２を受ける。また、コンバータ制御部３１は、電圧センサ１２－１，１２－２，１８からそれぞれ電圧Ｖｂ１，Ｖｂ２，Ｖｈの検出値を受け、電流センサ１０－１，１０－２からそれぞれ電流Ｉｂ１，Ｉｂ２の検出値を受ける。さらに、コンバータ制御部３１は、駆動制御部３２からモータジェネレータＭＧ１，ＭＧ２のトルク目標値ＴＲ１，ＴＲ２および回転数ＭＲＮ１，ＭＲＮ２を受ける。
【0052】
そして、コンバータ制御部３１は、その受けた各信号に基づいて、コンバータ８－１，８－２をそれぞれ駆動するための駆動信号ＰＷＣ１，ＰＷＣ２を生成し、その生成した駆動信号ＰＷＣ１，ＰＷＣ２をそれぞれコンバータ８－１，８－２へ出力する。
【0053】
駆動制御部３２は、アクセルペダルの操作量を示すアクセル開度信号ＡＣＣを図示されないアクセル開度センサから受け、車両速度を示す車速信号ＶＳを図示されない車速センサから受ける。また、駆動制御部３２は、蓄電装置６－１，６－２の状態量ＳＯＣ１，ＳＯＣ２を電池ＥＣＵ４から受ける。さらに、駆動制御部３２は、電圧Ｖｈ、モータジェネレータＭＧ１，ＭＧ２のモータ電流ＭＣＲＴ１，ＭＣＲＴ２、ロータ回転角θ１，θ２，蓄電装置６－１の放電電力上限値Ｗｏｕｔ１、充電電力上限値Ｗｉｎ１、電圧Ｖｂ２、電流Ｉｂ２、および回転数ＭＲＮ１，ＭＲＮ２を受ける。なお、モータジェネレータＭＧ１，ＭＧ２のモータ電流ＭＣＲＴ１，ＭＣＲＴ２およびロータ回転角θ１，θ２の各々は、図示されないセンサによって検出される。
【0054】
そして、駆動制御部３２は、その受けた各信号に基づいて、モータジェネレータＭＧ１，ＭＧ２をそれぞれ駆動するための駆動信号ＰＷＩ１，ＰＷＩ２を生成し、その生成した駆動信号ＰＷＩ１，ＰＷＩ２をそれぞれインバータ２０－１，２０－２へ出力する。また、駆動制御部３２は、駆動信号ＰＷＩ１，ＰＷＩ２の生成時に算出されたトルク目標値ＴＲ１，ＴＲ２および回転数ＭＲＮ１，ＭＲＮ２をコンバータ制御部３１へ出力する。
【0055】
図６は、図５に示したコンバータ制御部３１の詳細な機能ブロック図である。図６を参照して、コンバータ制御部３１は、目標値設定部７０と、電圧制御部７２－１と、電力制御部７２－２とを含む。
【0056】
目標値設定部７０は、駆動制御部３２（図５）からのトルク目標値ＴＲ１，ＴＲ２および回転数ＭＲＮ１，ＭＲＮ２に基づいて駆動力発生部２の要求パワーＰＲを算出し、その算出された要求パワーＰＲに基づいて、主正母線ＭＰＬおよび主負母線ＭＮＬ間の電圧Ｖｈの目標値を示す目標電圧ＶＲを算出する。
【0057】

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また、目標値設定部７０は、算出された要求パワーＰＲに基づいて、蓄電装置６－２の放電電力上限値Ｗｏｕｔ２および充電電力上限値Ｗｉｎ２を超えない範囲で、電力制御されるコンバータ８－２の充放電電力Ｐｂ２の目標値を示す目標電力ＰＲ２を算出する。たとえば、駆動力発生部２の要求パワーＰＲを蓄電装置６－１，６－２で均等に負担する場合、目標値設定部７０は、要求パワーＰＲの１／２をコンバータ８－２の目標電力ＰＲ２として算出する。なお、コンバータ８－２の目標電力ＰＲ２は駆動力発生部２の要求パワーＰＲの１／２に限定されるものではなく、蓄電装置６－１，６－２の各々のＳＯＣや温度等を考慮して蓄電装置６－１，６－２の負担配分を決定し、その配分に基づいて目標電力ＰＲ２を算出してもよい。

【0058】

電圧制御部７２－１は、減算部７４－１，７８－１と、ＰＩ制御部７６－１と、変調部８０－１とを含む。減算部７４－１は、目標電圧ＶＲから電圧Ｖｈを減算し、その演算結果をＰＩ制御部７６－１へ出力する。ＰＩ制御部７６－１は、目標電圧ＶＲと電圧Ｖｈとの偏差を入力として比例積分演算を行ない、その演算結果を減算部７８－１へ出力する。

【0059】

減算部７８－１は、電圧Ｖｂ１／目標電圧ＶＲで示されるコンバータ８－１の理論昇圧比の逆数からＰＩ制御部７６－１の出力を減算し、その演算結果をコンバータ８－１のデューティー指令として変調部８０－１へ出力する。変調部８０－１は、減算部７８－１からのデューティー指令と図示されない発振部により生成される搬送波（キャリア波）とに基づいて駆動信号ＰＷＣ１を生成し、その生成した駆動信号ＰＷＣ１をコンバータ８－１へ出力する。

【0060】

電力制御部７２－２は、乗算部７３と、減算部７４－２，７８－２と、ＰＩ制御部７６－２と、変調部８０－２とを含む。乗算部７３は、電流Ｉｂ２に電圧Ｖｂ２を乗算することによって蓄電装置６－２の充放電電力Ｐｂ２を算出する。

【0061】

減算部７４－２は、目標電力ＰＲ２から充放電電力Ｐｂ２を減算し、その演算結果をＰＩ制御部７６－２へ出力する。ＰＩ制御部７６－２は、目標電力ＰＲ２と充放電電力Ｐｂ２との偏差を入力として比例積分演算を行ない、その演算結果を減算部７８－２へ出力する。

【0062】

減算部７８－２は、電圧Ｖｂ２／目標電圧ＶＲで示されるコンバータ８－２の理論昇圧比の逆数からＰＩ制御部７６－２の出力を減算し、その演算結果をコンバータ８－２のデューティー指令として変調部８０－２へ出力する。変調部８０－３は、減算部７８－２からのデューティー指令と図示されない発振部により生成される搬送波（キャリア波）とに基づいて駆動信号ＰＷＣ２を生成し、その生成した駆動信号ＰＷＣ２をコンバータ８－２へ出力する。

【0063】

図７は、図３に示した駆動制御部３２の詳細な機能ブロック図である。図７を参照して、駆動制御部３２は、トルク算出部９０と、要求パワー算出部９２と、パワー制限制御部９４と、インバータ制御部９６とを含む。

【0064】

トルク算出部９０は、アクセル開度信号ＡＣＣ，車速信号ＶＳおよび蓄電装置６－１，６－２の状態量ＳＯＣ１，ＳＯＣ２に基づいて、モータジェネレータＭＧ１，ＭＧ２のトルク目標値ＴＲ１，ＴＲ２を算出する。要求パワー算出部９２は、モータジェネレータＭＧ１，ＭＧ２のトルク目標値ＴＲ１，ＴＲ２および回転数ＭＲＮ１，ＭＲＮ２に基づいてモータジェネレータＭＧ１，ＭＧ２の各々の要求パワーを算出し、モータジェネレータＭＧ１，ＭＧ２の各々の要求パワーを加算することによって駆動力発生部２の要求パワーＰＲを算出する。

【0065】

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パワー制限制御部９４は、要求パワーＰＲの制限値を設定し、要求パワーＰＲが制限値を超える場合には、要求パワーＰＲを制限値内に抑制するようにトルク算出部９０へトルク低減指令を出力する。ここで、要求パワーＰＲの制限値は、力行時においては、蓄電装置６－１の放電電力上限値Ｗｏｕｔ１にコンバータ８－２の目標電力ＰＲ２を加算することによって算出され、回生時においては、蓄電装置６－１の充電電力上限値Ｗｉｎ１に目標電力ＰＲ２を加算することによって算出される。なお、コンバータ８－２の目標電力ＰＲ２に代えて、電圧Ｖｂ２に電流Ｉｂ２を乗算して得られる蓄電装置６－２の充放電電力Ｐｂ２を加算してもよい。

【0066】

インバータ制御部９６は、トルク算出部９０によって算出されたトルク目標値ＴＲ１，ＴＲ２、モータジェネレータＭＧ１，ＭＧ２のモータ電流ＭＣＲＴ１，ＭＣＲＴ２、電圧Ｖｈおよびロータ回転角θ１，θ２に基づいて、モータジェネレータＭＧ１，ＭＧ２の各相電圧指令を生成する。そして、インバータ制御部９６は、その生成された各相電圧指令と図示されない発振部により生成される搬送波（キャリア波）とに基づいて駆動信号ＰＷｉ１，ＰＷＩ２を生成し、その生成した駆動信号ＰＷＩ１，ＰＷＩ２をそれぞれインバータ２０－１，２０－２へ出力する。

【0067】

図８は、図１に示したＨＶ－ＥＣＵ３の制御構造を説明するためのフローチャートである。なお、このフローチャートに示される処理は、一定時間ごとまたは所定の条件成立時にメインルーチンから呼び出されて実行される。

【0068】

図８を参照して、ＨＶ－ＥＣＵ３は、アクセル開度信号ＡＣＣ，車速信号ＳＶおよび蓄電装置６－１，６－２の状態量ＳＯＣ１，ＳＯＣ２に基づいて、駆動力発生部２に対する要求パワーＰＲを算出する（ステップＳ１０）。そして、ＨＶ－ＥＣＵ３は、その算出された要求パワーＰＲが、蓄電装置６－１の放電電力上限値Ｗｏｕｔ１に蓄電装置６－２の目標電力ＰＲ２を加えた制限値（Ｗｏｕｔ１＋ＰＲ２）よりも大きいか否かを判定する（ステップＳ２０）。

【0069】

要求パワーＰＲが制限値（Ｗｏｕｔ１＋ＰＲ２）よりも大きいと判定されると（ステップＳ２０においてＹＥＳ），ＨＶ－ＥＣＵ３は、駆動力発生部２の要求パワーＰＲを制限値（Ｗｏｕｔ１＋ＰＲ２）に制限する（ステップＳ３０）。

【0070】

一方、ステップＳ２０において要求パワーＰＲが制限値（Ｗｏｕｔ１－ＰＲ２）以下であると判定されると（ステップＳ２０においてＮＯ），ＨＶ－ＥＣＵ３は、要求パワーＰＲが、蓄電装置６－１の充電電力上限値Ｗｉｎ１に蓄電装置６－２の目標電力ＰＲ２を加えた制限値（Ｗｉｎ１＋ＰＲ２）よりも小さいか否かを判定する（ステップＳ４０）。

【0071】

そして、要求パワーＰＲが制限値（Ｗｉｎ１＋ＰＲ２）よりも小さいと判定されると（ステップＳ４０においてＹＥＳ），すなわち、要求パワーＰＲの大きさが制限値（Ｗｉｎ１－ＰＲ２）の絶対値よりも大きいと判定されると、ＨＶ－ＥＣＵ３は、駆動力発生部２の要求パワーＰＲを制限値（Ｗｉｎ１＋ＰＲ２）に制限する（ステップＳ５０）。

【0072】

次いで、ＨＶ－ＥＣＵ３は、要求パワーＰＲを生成するように駆動力発生部２を実際に制御する（ステップＳ６０）。また、駆動力発生部２の制御とともに、ＨＶ－ＥＣＵ３は、コンバータ８－１，８－２の制御も行なう。具体的には、ＨＶ－ＥＣＵ３は、要求パワーＰＲに基づいてコンバータ８－２の目標電力ＰＲ２を算出する（パワー配分制御）（ステップＳ７０）。さらに、ＨＶ－ＥＣＵ３は、主正母線ＭＰＬおよび主負母線ＭＮＬ間の電圧Ｖｈの目標値を示す目標電圧ＶＲを算出する。

【0073】

そして、ＨＶ－ＥＣＵ３は、電圧Ｖｈが目標電圧ＶＲとなるように、コンバータ８－１

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を電圧制御し、蓄電装置６－２の充放電電力Ｐｂ２が目標電力ＰＲ２となるように、コンバータ８－２を電力制御する（ステップＳ９０）。

【0074】

以上のように、この実施の形態１においては、コンバータ８－１は、電圧Ｖｈが目標電圧ＶＲとなるように電圧制御される。コンバータ８－２は、蓄電装置６－２の充放電電力Ｐｂ２が目標電力ＰＲ２となるように電力制御される。そして、ＨＶ－ＥＣＵ３は、蓄電装置６－１に対する電力上限値に蓄電装置６－２の充放電電力を加えた値に、駆動力発生部２に対する要求パワーＰＲを制限するので、蓄電装置６－１の充放電電力Ｐｂ１が蓄電装置６－１に対する電力上限値（Ｗｏｕｔ１，Ｗｉｎ１）を超えることはない。したがって、この実施の形態１によれば、駆動力発生部２の出力回転数が急変しても各蓄電装置６－１，６－２の入出力パワーを制限値内に制御することができる。

【0075】

［実施の形態２］

実施の形態１では、蓄電装置６－１の電力上下限値に蓄電装置６－２の充放電電力を加算した値に、駆動力発生部２のパワーＰｏを制限することによって、電圧制御されるコンバータ８－１に対応する蓄電装置６－１の充放電電力の上下限を保障することとした。この実施の形態２では、蓄電装置６－１の充放電電力の上下限をより確実に保障するための方策が示される。

【0076】

図９は、実施の形態２におけるモータジェネレータＭＧ１，ＭＧ２および蓄電装置６－１，６－２の電力配分の考え方を説明するための図である。なお、以下では、モータジェネレータＭＧ１は、エンジン出力を用いて発電可能な発電機として機能し、モータジェネレータＭＧ２は、駆動輪を駆動する電動機として機能するものとする。

【0077】

図９を参照して、「ＭＧ１」は、モータジェネレータＭＧ１のパワーを示し、値が負であることはエンジン出力を用いて発電していることを示す。「ＭＧ２」は、モータジェネレータＭＧ２のパワーを示す。また、図９において、上段は、スリップ前の状態を示し、下段は、スリップ中の状態を示す。なお、比較のため、この実施の形態２によるパワー制限制御パワー制限制御が行なわれなかった場合（従来相当）のスリップ中の状態を図の中段に示す。

【0078】

スリップ発生前（非スリップ時）、モータジェネレータＭＧ１は、エンジン出力を用いて発電を行なっている。モータジェネレータＭＧ２の出力は、モータジェネレータＭＧ１の発電パワーよりも大きく、不足分が蓄電装置６－１，６－２から持ち出されている（すなわち蓄電装置６－１，６－２は放電状態）。

【0079】

駆動輪のスリップが発生すると、上述したようにスリップ発生直後はモータジェネレータＭＧ２の回転数が急増するところ、モータジェネレータＭＧ２の過回転を防止するために、モータジェネレータＭＧ２のトルクが低減される。これにより、モータジェネレータＭＧ２の出力が低下する。そうすると、駆動力発生部２においてモータジェネレータＭＧ１の発電電力がモータジェネレータＭＧ２によって消費されなくなり、駆動力発生部２から電源部１へ電力が流れ込む状況が発生する。

【0080】

このとき、駆動力発生部２の出力変化が電源部１における蓄電装置６－１，６－２のパワー配分制御に直ちに反映されればよいが、上述したように、回転数検出信号のフィルタ処理や信号伝達の遅れ等により、駆動力発生部２の出力変化が蓄電装置６－１，６－２のパワー配分制御に直ちに反映されないという状況が一時的に発生する。これにより、駆動力発生部２および蓄電装置６－２からの電力が蓄電装置６－１へ流れ込み、蓄電装置６－１の充電電力Ｐｂ１が充電電力上限値Ｗｉｎ１を超えるという状況が生じていた（図９中段）。

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【００８１】
そこで、この実施の形態２では、駆動輪を駆動するモータジェネレータＭＧ２の回転数（または駆動輪自体の回転数であってもよい。）が急変した場合には、蓄電装置６－２の充放電電力が零になるようにコンバータ８－２を制御し、蓄電装置６－１の充放電電力が過大になるのを防止することとしたものである（図９下段）。
【００８２】
図１０は、実施の形態２におけるコンバータ制御部の詳細な機能ブロック図である。図１０を参照して、コンバータ制御部３１Ａは、図６に示した実施の形態１におけるコンバータ制御部３１の構成において、スリップ・グリップ判定部８２をさらに含む。
【００８３】
スリップ・グリップ判定部８２は、駆動輪を駆動するモータジェネレータＭＧ２の回転数ＭＲＮ２を受け、その受けた回転数ＭＲＮ２の変化に基づいて、スリップ判定、グリップ判定、またはスリップ／グリップの状態変化有無の判定を行なう。なお、スリップ・グリップ判定部８２は、回転数ＭＲＮ２に基づいて、単に回転数ＭＲＮ２の急変を検知するものであってもよい。そして、回転数ＭＲＮ２の急変が検知されると、スリップ・グリップ判定部８２は、その旨を目標値設定部７０へ通知する。
【００８４】
目標値設定部７０は、モータジェネレータＭＧ２の回転数ＭＲＮ２が急変したとの通知をスリップ・グリップ判定部８２から受けると、蓄電装置６－２の目標電力ＰＲ２を零に設定する。なお、目標値設定部７０のその他の機能は、実施の形態１と同じである。また、コンバータ制御部３１Ａのその他の機能は、実施の形態１におけるコンバータ制御部３１と同じであり、駆動制御部３２の構成は、実施の形態１と同じである。
【００８５】
図１１は、実施の形態２におけるＨＶ－ＥＣＵ３Ａの制御構造を説明するためのフローチャートである。なお、このフローチャートに示される処理も、一定時間ごとまたは所定の条件成立時にメインルーチンから呼び出されて実行される。
【００８６】
図１１を参照して、このフローチャートは、図８に示したフローチャートにおいて、ステップＳ７２，Ｓ７４をさらに含む。すなわち、ステップＳ７０に続いて、ＨＶ－ＥＣＵ３Ａは、駆動輪を駆動するモータジェネレータＭＧ２の回転数ＭＲＮ２が急変したか否かを判定する（ステップＳ７２）。そして、ＨＶ－ＥＣＵ３Ａは、回転数ＭＲＮ２の急変を検知すると（ステップＳ７２においてＹＥＳ）、コンバータ８－２の目標電力ＰＲ２を零に設定する。その後、ＨＶ－ＥＣＵ３Ａは、ステップＳ８０へ処理を進め、目標電圧ＶＲを算出する。
【００８７】
以上のように、この実施の形態２においては、駆動輪を駆動するモータジェネレータＭＧ２の回転数ＭＲＮ２（駆動輪自体の回転数であってもよい。）の急変が検知されると、コンバータ８－２の目標電力ＰＲ２が零に設定されるので、蓄電装置６－２の充放電電力Ｐｂ２が零となる。したがって、この実施の形態２によれば、蓄電装置６－１の入出力パワーが上下限値を超えるのを確実に防止することができる。
【００８８】
なお、上記の実施の形態１，２においては、蓄電装置６－２の目標電力ＰＲ２に基づいてコンバータ８－２を電力制御するものとしたが、目標電力ＰＲ２に基づいてコンバータ８－２を電流制御してもよい。
【００８９】
図１２は、目標電力ＰＲ２に基づいてコンバータ８－２を電流制御する場合のコンバータ制御部の機能ブロック図である。なお、この図１２では、実施の形態１におけるコンバータ制御部３１に対応する構成が示されるが、実施の形態２におけるコンバータ制御部３１Ａについても同様の構成を採用することができる。
【００９０】

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図１２を参照して、このコンバータ制御部３１Ｂは、図６に示したコンバータ制御部３１の構成において、除算部８４をさらに含み、電力制御部７２－２に代えて電流制御部７２－２Ａを含む。

【0091】

除算部８４は、目標値設定部７０からのコンバータ８－２の目標電力ＰＲ２を蓄電装置６－２の電圧Ｖｂ２で除算し、その演算結果を目標電流ＩＲ２として電流制御部７２－２Ａへ出力する。

【0092】

電流制御部７２－２Ａは、図６に示した電力制御部７２－２の構成において、乗算部７３を含まない構成から成る。減算部７４－２は、目標電流ＩＲ２から電流Ｉｂ２を減算し、その演算結果をＰＩ制御部７６－２へ出力する。そして、ＰＩ制御部７６－２は、目標電流ＩＲ２と電流Ｉｂ２との偏差を入力として比例積分演算を行ない、その演算結果を減算部７８－２へ出力する。なお、コンバータ制御部３１Ｂのその他の構成は、コンバータ制御部３１と同じである。

【0093】

なお、上記において、ＨＶ－ＥＣＵ３，３Ａにおける制御は、実際には、ＣＰＵ（Central Processing Unit）によって行なわれ、ＣＰＵは、図８，１１に示したフローチャートの各ステップを備えるプログラムをＲＯＭ（Read Only Memory）から読出し、その読出したプログラムを実行して図８，１１に示したフローチャートに従って処理を実行する。したがって、ＲＯＭは、図８，１１に示したフローチャートの各ステップを備えるプログラムを記録したコンピュータ（ＣＰＵ）読取可能な記録媒体に相当する。

【0094】

なお、上記の各実施の形態においては、コンバータ８－１を電圧制御し、コンバータ８－２を電力制御（電流制御）するものとしたが、コンバータ８－２を電圧制御し、コンバータ８－１を電力制御（電流制御）してもよい。

【0095】

また、上記においては、電源部１は、２つの蓄電装置とそれらに対応する２つのコンバータとを含むものとしたが、電源部１は、３つ以上の蓄電装置とそれらに対応するコンバータとを含むものであってもよい。この場合、いずれかのコンバータを電圧制御し、その他のコンバータを電力制御する。そして、実施の形態１に対応する構成としては、電圧制御のコンバータに対応する蓄電装置に対する電力上下限値に電力制御のコンバータに対応する各蓄電装置の充放電電力を加えた値に、駆動力発生部２に対する要求パワーＰＲを制限すればよい。また、実施の形態２に対応する構成としては、駆動輪の回転数の急変が検知されたとき、電力制御されるコンバータに対応する蓄電装置の目標電力を零に設定すればよい。

【0096】

また、上記においては、ＨＶ－ＥＣＵ３，３Ａによってコンバータ８－１，８－２およびインバータ２０－１，２０－２を制御するものとしたが、コンバータ制御用とインバータ制御用とでＥＣＵを分離構成してもよい。あるいは、電池ＥＣＵ４とＨＶ－ＥＣＵ３，３Ａとを１つのＥＣＵで構成してもよい。

【0097】

また、この発明は、動力源としてエンジンを備えるハイブリッド車両や、エンジンを備えずに電力のみで走行する電気自動車、電源として燃料電池をさらに備える燃料電池車などの電動車両全般に適用可能である。

【0098】

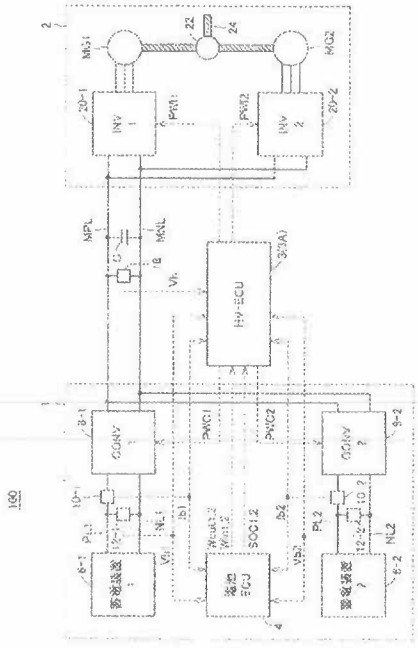
なお、上記において、ＨＶ－ＥＣＵ３，３Ａは、この発明における「制御部」に対応し、蓄電装置６－１，６－２は、それぞれこの発明における「第１の蓄電装置」および「第２の蓄電装置」に対応する。また、コンバータ８－１，８－２は、それぞれこの発明における「第１のコンバータ」および「第２のコンバータ」に対応し、スリップ・グリップ判定部８２は、この発明における「判定部」に対応する。

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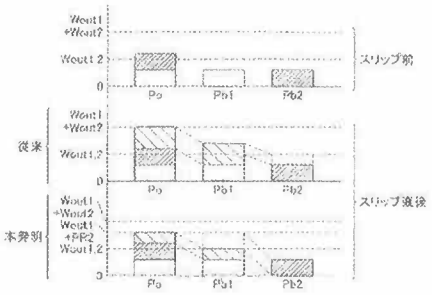
【0099】
今回開示された実施の形態は、すべての点で例示であって制限的なものではないと考えられるべきである。本発明の範囲は、上記した実施の形態の説明ではなくて特許請求の範囲によって示され、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれることが意図される。
【図面の簡単な説明】
【0100】
【図1】この発明の実施の形態１による電動車両の全体ブロック図である。
【図2】図１に示すＨＶ－ＥＣＵによるパワー制限制御の考え方を説明するための図である。
【図3】スリップ発生時における蓄電装置の充放電電力の時間的推移を示した第１の図である。
【図4】スリップ発生時における蓄電装置の充放電電力の時間的推移を示した第２の図である。
【図5】図１に示すＨＶ－ＥＣＵの機能ブロック図である。
【図6】図５に示すコンバータ制御部の詳細な機能ブロック図である。
【図7】図５に示す駆動制御部の詳細な機能ブロック図である。
【図8】図１に示すＨＶ－ＥＣＵの制御構造を説明するためのフローチャートである。
【図9】実施の形態２におけるモータジェネレータおよび蓄電装置の電力配分の考え方を説明するための図である。
【図10】実施の形態２におけるコンバータ制御部の詳細な機能ブロック図である。
【図11】実施の形態２におけるＨＶ－ＥＣＵの制御構造を説明するためのフローチャートである。
【図12】目標電力に基づいてコンバータを電流制御する場合のコンバータ制御部の機能ブロック図である。
【符号の説明】
【0101】
１　電源部，２　駆動力発生部，３，３Ａ　ＨＶ－ＥＣＵ，４　電池ＥＣＵ，６－１，６－２　蓄電装置，８－１，８－２　コンバータ，１０－１，１０－２　電流センサ，１２－１，１２－２，１８　電圧センサ，２０－１，２０－２　インバータ，２２　動力伝達機構，２４　駆動軸，３１，３１Ａ　コンバータ制御部，３２　駆動制御部，７０　目標値設定部，７２－１　電圧制御部，７２－２　電力制御部，７２－２Ａ　電流制御部，７３　乗算部，７４－１，７４－２，７８－１，７８－２　減算部，７６－１，７６－２　ＰＩ制御部，８０－１，８０－２　変調部，８２　スリップ・グリップ判定部，８４　除算部，９０　トルク算出部，９２　要求パワー算出部，９４　パワー制限制御部，９６　インバータ制御部，１００　電動車両，ＭＰＬ　主正母線，ＭＮＬ　主負母線，Ｃ　コンデンサ，ＭＧ１，ＭＧ２　モータジェネレータ，ＰＬ１，ＰＬ２　正極線，ＮＬ１，ＮＬ２　負極線。

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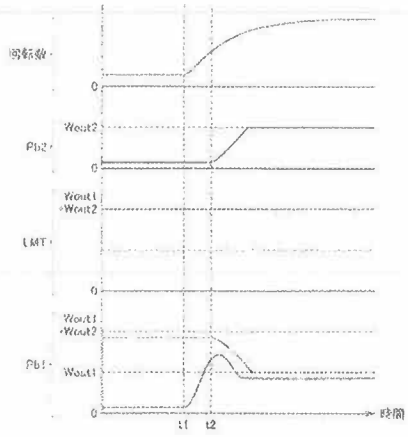
【図1】



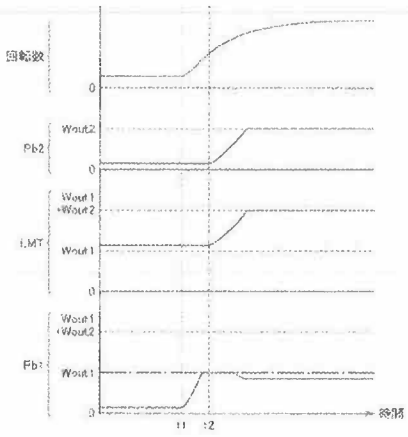
【図2】



【図3】

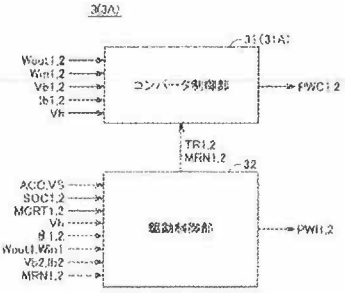


【図4】

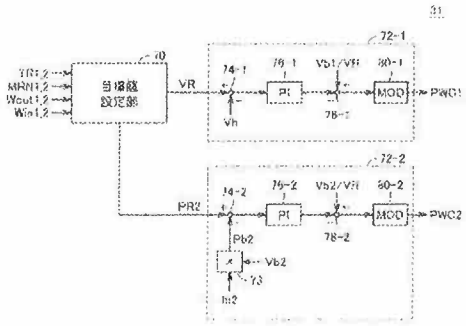


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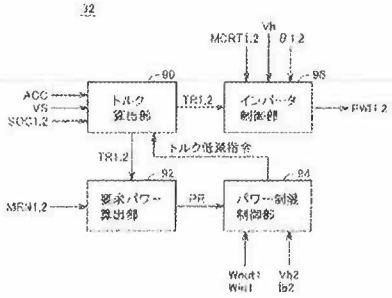
【図5】



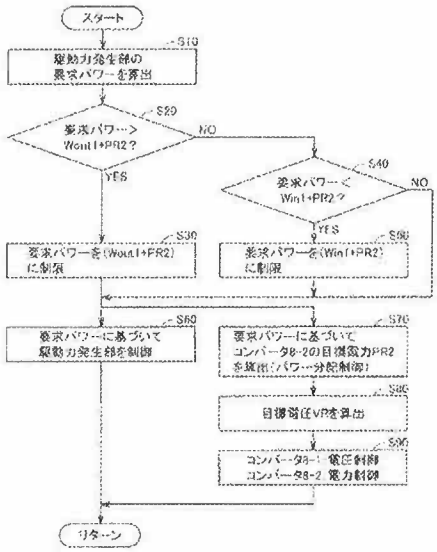
【図6】



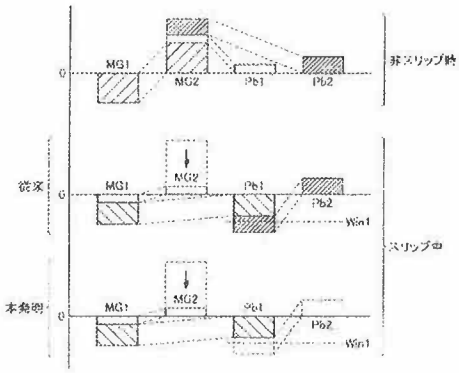
【図7】



【図8】

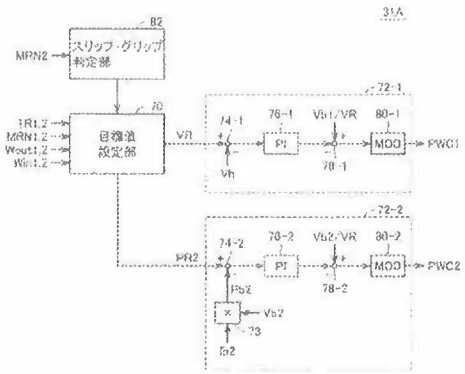


【図9】

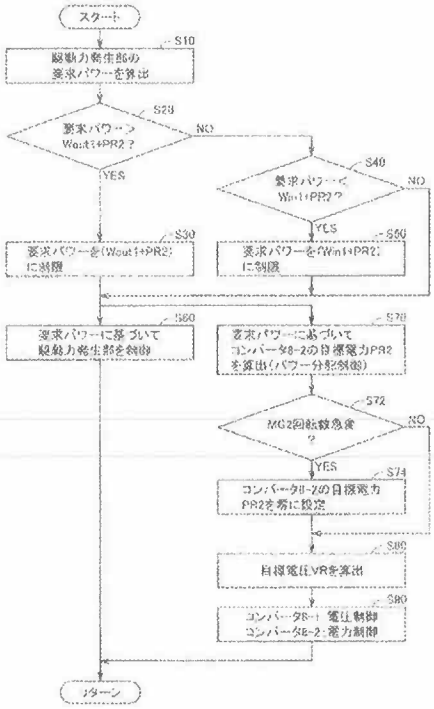


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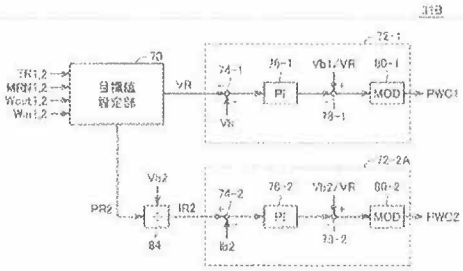
【図10】


31A
82
スリップ・グリップ判定部
MRN2
70
目標値設定部
TR1,2
MRN1,2
Wout1,2
Win1,2
VR
72-1
74-1
76-1
Vb1/VR
80-1
PI
MOD
PWC1
78-1
Vb
72-2
74-2
76-2
Vb2/VR
80-2
PR2
Pb2
Vb2
73
Ib2
78-2
PWC2

【図11】


スタート
S10
駆動力発生部の要求パワーを算出
S20
要求パワー＞Wout1+PR2？
NO
YES
S40
要求パワー＜Win1+PR2？
NO
YES
S30
要求パワーを(Wout1+PR2)に制限
S50
要求パワーを(Win1+PR2)に制限
S60
要求パワーに基づいて駆動力発生部を制御
S70
要求パワーに基づいてコンバータB-2の目標電力PR2を算出(パワー分配制御)
S72
MG2回転数急変？
NO
YES
S74
コンバータB-2の目標電力PR2を零に設定
S80
目標電圧VRを算出
S90
コンバータB-1：電圧制御
コンバータB-2：電力制御
リターン

【図12】


31B
70
目標値設定部
TR1,2
MRN1,2
Wout1,2
Win1,2
VR
72-1
74-1
76-1
Vb1/VR
80-1
PI
MOD
PWC1
78-1
Vb
Vb2
PR2
IR2
84
72-2A
74-2
76-2
Vb2/VR
80-2
Ib2
78-2
PWC2

(51)Int.Cl.　　F I　　テーマコード（参考）
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Ｈ０２Ｍ　3/155　(2006.01)　　Ｈ０２Ｍ　3/155　Ｗ

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Ｆターム(参考)　5H115　PA13　PA15　PC06　PG04　PI14　PI16　PI29　PU11　PV07　PV10
QE14　QN03　QN08　RB14　SE03　SE06　TB01　T102　T013　T014
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5H730　AA04　AS13　BB02　BB14　BB15　BB57　BB82　BB83　BB86　BB88
CC11　CC16　CC17　EE59　EE61　FD01　FD11　FD41　FF06　FF09
XX35

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Espacenet

Bibliographic data: JP2013188106 (A) — 2013-09-19

DEVICE AND METHOD FOR DETECTING CONVERTER FAILURE

Inventor(s): YAMAZAKI MIKIO ± (YAMAZAKI MIKIO, ; 山崎 幹夫)

Applicant(s): TOYOTA MOTOR CORP ± (TOYOTA MOTOR CORP, ; トヨタ自動車株式会社)

Classification: - international: ***B60L3/00; H02M3/155***
- cooperative: Y02T10/7216; Y02T10/7241; Y02T90/127

Application number: JP20120054270 20120312 Global Dossier

Priority number (s): JP20120054270 20120312

Also published as: JP5699969 (B2)

Abstract of JP2013188106 (A)

PROBLEM TO BE SOLVED: To provide a converter failure detection device that can detect a failure of a converter by positively producing a situation to detect the failure of the converter.SOLUTION: A control device 40 detects a failure of a switching element Q1 of an upper arm side based on a voltage VL and a voltage VH by making the voltage VL and the voltage VH the same by turning off a switching element Q2 of a lower arm side, while turning on the switching element Q1 of the upper arm side, when a vehicle has stopped, afterwards turning off the switching element Q1 of the upper arm side and the switching element Q2 of the lower arm side, and in addition turning off system relays SMRB and SMRG, and operating afterwards a DC/DC converter 30.

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(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
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(P2013-188106A)
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H02M	3/155	(2006.01)	H02M	3/155	C	5H730
			H02M	3/155	U	

審査請求 未請求　請求項の数 4　OL　（全 12 頁）

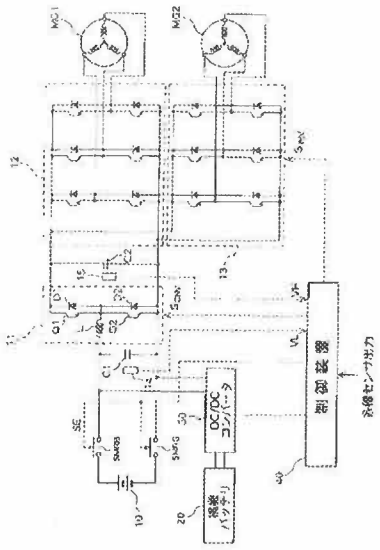
(21)出願番号　特願2012-54270(P2012-54270)
(22)出願日　平成24年3月12日(2012.3.12)

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Ｆターム(参考)　5H125 AA01 AC12 BB05 BB07 BC25
DD01 EE13 EE16
5H730 AA20 AS04 AS05 BB14 BB86
DD02 DD41 FD26 FF01 FF09
FG12 XX04 XX13 XX26 XX33

(54)【発明の名称】コンバータ故障検出装置及びコンバータ故障検出方法

(57)【要約】
【課題】コンバータの故障を検出する状況を積極的に作り出してコンバータの故障を検出することが可能なコンバータ故障検出装置を提供する。
【解決手段】制御装置４０は、車両が停止している場合に、上アーム側のスイッチング素子Ｑ１をオンするとともに下アーム側のスイッチング素子Ｑ２をオフすることで、電圧ＶＬと電圧ＶＨとを同一にし、その後、上アーム側のスイッチング素子Ｑ１と下アーム側のスイッチング素子Ｑ２とをオフし、さらにシステムリレーＳＭＲＢ、ＳＭＲＧをオフし、その後、ＤＣ／ＤＣコンバータ３０を作動させ、電圧ＶＬと電圧ＶＨとに基づいて上アーム側のスイッチング素子Ｑ１の故障を検出する。
【選択図】図１



【特許請求の範囲】
【請求項１】
車両に搭載されたモータに接続されたインバータと第１のバッテリとの間に設けられ、前記インバータの正極側母線と前記インバータの負極側母線との間に直列に接続された上アーム側スイッチング素子と下アーム側スイッチング素子とを含み、前記下アーム側スイッチング素子をオン／オフすることで前記第１のバッテリからの電圧を昇圧して前記インバータに供給し、前記上アーム側スイッチング素子をオン／オフすることで前記インバータからの電圧を降圧して前記第１のバッテリに供給するコンバータの故障を検出するコンバータ故障検出装置であって、
前記第１のバッテリと前記コンバータとの間に接続されたＤＣ／ＤＣコンバータであって、前記第１のバッテリよりも電圧が低く前記車両に搭載された補機に電圧を供給する第２のバッテリに、前記第１のバッテリからの電圧を降圧して供給するＤＣ／ＤＣコンバータと、
前記車両が停止している場合に、前記上アーム側スイッチング素子をオンするとともに前記下アーム側スイッチング素子をオフすることで、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとを同一にし、その後、前記上アーム側スイッチング素子と前記下アーム側スイッチング素子とをオフし、前記コンバータと前記ＤＣ／ＤＣコンバータとを接続させた状態で、前記第１のバッテリと前記コンバータとの接続及び前記第１のバッテリと前記ＤＣ／ＤＣコンバータとの接続を解除し、その後、前記ＤＣ／ＤＣコンバータを作動させ、前記コンバータの前記インバータ側の電圧ＶＨに基づいて前記コンバータの故障を検出する制御手段と、
を有することを特徴とするコンバータ故障検出装置。
【請求項２】
請求項１に記載のコンバータ故障検出装置であって、
前記制御手段は、前記ＤＣ／ＤＣコンバータを作動させた後、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとの大小関係に基づいて前記コンバータの故障を検出する、
ことを特徴とするコンバータ故障検出装置。
【請求項３】
車両に搭載されたモータに接続されたインバータと第１のバッテリとの間に設けられ、前記インバータの正極側母線と前記インバータの負極側母線との間に直列に接続された上アーム側スイッチング素子と下アーム側スイッチング素子とを含み、前記下アーム側スイッチング素子をオン／オフすることで前記第１のバッテリからの電圧を昇圧して前記インバータに供給し、前記上アーム側スイッチング素子をオン／オフすることで前記インバータからの電圧を降圧して前記第１のバッテリに供給するコンバータの故障を検出するコンバータ故障検出方法であって、
前記車両が停止している間に、前記上アーム側スイッチング素子をオンするとともに前記下アーム側スイッチング素子をオフすることで、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとを同一にする第１のステップと、
前記第１のステップの後、前記上アーム側スイッチング素子と前記下アーム側スイッチング素子とをオフし、前記第１のバッテリと前記コンバータとの接続を解除する第２のステップと、
前記第２のステップの後、前記第１のバッテリと前記コンバータとの間に接続されたＤＣ／ＤＣコンバータであって、前記第１のバッテリよりも電圧が低く前記車両に搭載された補機に電圧を供給する第２のバッテリに、前記第１のバッテリからの電圧を降圧して供給するＤＣ／ＤＣコンバータを、前記第１のバッテリとの接続を解除した状態で作動させる第３のステップと、
前記第３のステップの後、前記コンバータの前記インバータ側の電圧ＶＨに基づいて前記コンバータの故障を検出する第４のステップと、

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を含むことを特徴とするコンバータ故障検出方法。
【請求項４】
請求項３に記載のコンバータ故障検出方法であって、
前記第４のステップでは、前記ＤＣ／ＤＣコンバータを作動させた後、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとの大小関係に基づいて前記コンバータの故障を検出する、
ことを特徴とするコンバータ故障検出方法。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、車両に搭載されるコンバータの故障を検出するコンバータ故障検出装置及びコンバータ故障検出方法に関する。
【背景技術】
【０００２】
電気自動車、ハイブリッド自動車及び燃料電池自動車等の車両のように、モータの駆動力によって走行する車両が知られている。このような車両は、スイッチング素子をオン／オフすることでバッテリからの電圧を電圧変換するコンバータと、コンバータからの電圧を交流電圧に変換してモータに供給するインバータとを備えている。
【０００３】
コンバータにおいては、スイッチング素子の短絡故障が発生することがあり、その結果、素子焼損や負荷破壊等が発生するおそれがある。従来においては、バッテリからの電圧ＶＬを指令値に従ってコンバータによって実際に昇圧し、昇圧後にコンバータから出力される電圧ＶＨを測定し、実際に測定された電圧ＶＨと指令値が示す電圧値とを比較することで、コンバータのスイッチング素子の短絡故障を検出していた。この場合、測定された電圧ＶＨと指令値が示す電圧値とが異なる場合に、スイッチング素子に短絡故障が発生していると判定されていた。
【０００４】
また、下記の特許文献１には、異常検出用リレーが設けられた充電器を備えた電源装置であって、異常検出用リレーをオンすることでバッテリと外部電源とを接続し、電圧を検出することで充電器よりも外部電源側の短絡を検出する電源装置が開示されている。
【０００５】
また、下記の特許文献２には、第１のシステムメインリレーによって第１のバッテリと第１の昇圧回路とが接続され、かつ、第２のシステムメインリレーによって第２のバッテリと第２の昇圧回路との接続が解除されたときに、第２の昇圧回路の第２のバッテリ側の電圧に基づいて、第２の昇圧回路のスイッチング素子の故障を検知する装置が開示されている。
【０００６】
また、下記の特許文献３には、チョッパ回路におけるスイッチング素子の端子電圧の時間変化成分を算出し、スイッチング素子がオン／オフされるタイミングと時間変化成分とに基づいて故障検出を中断する区間を求め、当該中断する区間を除いてスイッチング素子の故障を検出する装置が開示されている。
【先行技術文献】
【特許文献】
【０００７】
【特許文献１】特開２０１０－２１３５５２号公報
【特許文献２】特開２０１０－２５９２６５号公報
【特許文献３】特開２０１１－１９３５４９号公報
【発明の概要】
【発明が解決しようとする課題】
【０００８】

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上述したように、昇圧回路として機能させるためにコンバータを作動させ、昇圧後の電圧ＶＨと指令値が示す電圧値とを比較する方法によると、スイッチング素子の短絡故障を検出することができるが、短絡故障が発生している場合には実際は昇圧されていないことになるため、電力が不足して必要なトルクが得られず、トルク抜けやエンジン吹け上がりが発生し、その結果、ドライバビリティが低下するおそれがある。また、昇圧を必要としない状況で昇圧を行って故障を検出する場合、燃費を低下させてしまうことになる。

【０００９】

また、上記の特許文献１に記載された装置は、充電器よりも外部電源側の短絡を検出するに過ぎず、コンバータのスイッチング素子の故障を検出する装置ではない。また、上記の特許文献２に記載された装置は、第１のバッテリと第１の昇圧回路とが接続され、かつ、第２のバッテリと第２の昇圧回路との接続が解除された場合にのみ、スイッチング素子の故障を検出することができるに過ぎず、そのような状況を待っているだけでは故障検出の機会が限られてしまい、故障検出のタイミングを逃してしまうおそれがある。また、上記の特許文献３に記載された装置は、故障検出を中断する区間ではスイッチング素子の故障を検出することができず、この場合も、故障検出のタイミングを逃してしまうおそれがある。

【００１０】

本発明の目的は、コンバータの故障を検出するための状況を積極的に作り出してコンバータの故障を検出することが可能なコンバータ故障検出装置及びコンバータ故障検出方法を提供することである。

【課題を解決するための手段】

【００１１】

本発明は、車両に搭載されたモータに接続されたインバータと第１のバッテリとの間に設けられ、前記インバータの正極側母線と前記インバータの負極側母線との間に直列に接続された上アーム側スイッチング素子と下アーム側スイッチング素子とを含み、前記下アーム側スイッチング素子をオン／オフすることで前記第１のバッテリからの電圧を昇圧して前記インバータに供給し、前記上アーム側スイッチング素子をオン／オフすることで前記インバータからの電圧を降圧して前記第１のバッテリに供給するコンバータの故障を検出するコンバータ故障検出装置であって、前記第１のバッテリと前記コンバータとの間に接続されたＤＣ／ＤＣコンバータであって、前記第１のバッテリよりも電圧が低く前記車両に搭載された補機に電圧を供給する第２のバッテリに、前記第１のバッテリからの電圧を降圧して供給するＤＣ／ＤＣコンバータと、前記車両が停止している場合に、前記上アーム側スイッチング素子をオンするとともに前記下アーム側スイッチング素子をオフすることで、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとを同一にし、その後、前記上アーム側スイッチング素子と前記下アーム側スイッチング素子とをオフし、前記コンバータと前記ＤＣ／ＤＣコンバータとを接続させた状態で、前記第１のバッテリと前記コンバータとの接続及び前記第１のバッテリと前記ＤＣ／ＤＣコンバータとの接続を解除し、その後、前記ＤＣ／ＤＣコンバータを作動させ、前記コンバータの前記インバータ側の電圧ＶＨに基づいて前記コンバータの故障を検出する制御手段と、を有することを特徴とするコンバータ故障検出装置である。

【００１２】

また、前記制御手段は、前記ＤＣ／ＤＣコンバータを作動させた後、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとの大小関係に基づいて前記コンバータの故障を検出することが好ましい。

【００１３】

また、本発明は、車両に搭載されたモータに接続されたインバータと第１のバッテリとの間に設けられ、前記インバータの正極側母線と前記インバータの負極側母線との間に直列に接続された上アーム側スイッチング素子と下アーム側スイッチング素子とを含み、前記下アーム側スイッチング素子をオン／オフすることで前記第１のバッテリからの電圧を昇圧して前記インバータに供給し、前記上アーム側スイッチング素子をオン／オフするこ

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とで前記インバータからの電圧を降圧して前記第１のバッテリに供給するコンバータの故障を検出するコンバータ故障検出方法であって、前記車両が停止している間に、前記上アーム側スイッチング素子をオンするとともに前記下アーム側スイッチング素子をオフすることで、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとを同一にする第１のステップと、前記第１のステップの後、前記上アーム側スイッチング素子と前記下アーム側スイッチング素子とをオフし、前記第１のバッテリと前記コンバータとの接続を解除する第２のステップと、前記第２のステップの後、前記第１のバッテリと前記コンバータとの間に接続されたＤＣ／ＤＣコンバータであって、前記第１のバッテリよりも電圧が低く前記車両に搭載された補機に電圧を供給する第２のバッテリに、前記第１のバッテリからの電圧を降圧して供給するＤＣ／ＤＣコンバータを、前記第１のバッテリとの接続を解除した状態で作動させる第３のステップと、前記第３のステップの後、前記コンバータの前記インバータ側の電圧ＶＨに基づいて前記コンバータの故障を検出する第４のステップと、を含むことを特徴とするコンバータ故障検出方法である。

【００１４】

また、前記第４のステップでは、前記ＤＣ／ＤＣコンバータを作動させた後、前記コンバータの前記第１のバッテリ側の電圧ＶＬと前記コンバータの前記インバータ側の電圧ＶＨとの大小関係に基づいて前記コンバータの故障を検出することが好ましい。

【発明の効果】

【００１５】

本発明によると、コンバータによる昇圧を実際に行わなくても、コンバータの故障を検出するための状況を車両の停車中に作り出してコンバータの故障を検出することが可能となる。

【図面の簡単な説明】

【００１６】

【図１】本発明の実施形態に係るコンバータ故障検出装置を搭載した車両の概略構成を示す図である。

【図２】本発明の実施形態に係るコンバータ故障検出装置による動作の一例を示すフローチャートである。

【図３】コンバータの直流電源側の電圧とインバータ側の電圧との時間変化を示すグラフである。

【発明を実施するための形態】

【００１７】

図１を参照して、本発明の実施形態に係るコンバータ故障検出装置について説明する。本実施形態に係るコンバータ故障検出装置は、駆動源としてモータを備える電気自動車、ハイブリッド自動車又は燃料電池自動車に搭載される。図１には一例としてハイブリッド自動車の概略構成を示す。

【００１８】

図１に示す車両は、一例として、直流電源１０と、システムリレーＳＭＲＢ，ＳＭＲＧと、コンバータ１１と、インバータ１２，１３と、電圧センサ１４，１５と、補機バッテリ２０と、ＤＣ／ＤＣコンバータ３０と、制御装置４０と、モータジェネレータＭＧ１，ＭＧ２と、図示しないエンジン（内燃機関）とを含んで構成されている。モータジェネレータＭＧ１にはインバータ１２が接続され、モータジェネレータＭＧ２にはインバータ１３が接続され、直流電源１０とインバータ１２，１３との間にはコンバータ１１が設けられている。

【００１９】

図示しないエンジンは、ガソリン等の燃料の燃焼エネルギーを源として駆動力を発生する。エンジンが発生する駆動力は２つの経路に分割される。一方は、図示しない減速機を介して車輪を駆動する駆動軸に伝達する経路であり、他方は、モータジェネレータＭＧ１へ伝達する経路である。

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【００２０】
モータジェネレータＭＧ１，ＭＧ２は、例えば三相交流同期型モータであり、直流電源１０に蓄えられた電力によって駆動される。モータジェネレータＭＧ１は、図示しないエンジンによって駆動される発電機として機能し、また、エンジンに対して電動機として動作してエンジンを始動し得るモータである。モータジェネレータＭＧ２は、車両の駆動輪を駆動するためのトルクを発生するためのモータである。
【００２１】
インバータ１２は、スイッチング素子とダイオードとを複数組み合わせて構成され、制御装置４０からのスイッチング制御信号S_{INV}に基づいて、直流電源１０側からコンバータ１１を介して供給される直流電圧（電圧ＶＨ）を三相交流電圧に変換してモータジェネレータＭＧ１に供給する。これにより、モータジェネレータＭＧ１は、トルク指令値によって指定された要求トルクを発生するように駆動される。また、インバータ１２は、回生制動時に、モータジェネレータＭＧ１が発電した交流電圧を制御装置４０からのスイッチング制御信号S_{INV}に基づいて直流電圧に変換し、変換した直流電圧をコンバータ１１を介して直流電源１０に供給する。なお、回生制動とは、ハイブリッド自動車を運転するドライバーによるフットブレーキ操作があった場合の回生発電を伴う制動や、フットブレーキを操作しないものの、走行中にアクセルペダルをオフすることで回生充電をさせながら車両を減速させることも含む。
【００２２】
インバータ１３は、スイッチング素子とダイオードとを複数組み合わせて構成され、制御装置４０からのスイッチング制御信号S_{INV}に基づいて、直流電源１０側からコンバータ１１を介して供給される直流電圧（電圧ＶＨ）を三相交流電圧に変換してモータジェネレータＭＧ２に供給する。これにより、モータジェネレータＭＧ２は、トルク指令値によって指定された要求トルクを発生するように駆動される。また、インバータ１３は、回生制動時に、モータジェネレータＭＧ２が発電した交流電圧を制御装置４０からのスイッチング制御信号S_{INV}に基づいて直流電圧に変換し、変換した直流電圧をコンバータ１１を介して直流電源１０に供給する。
【００２３】
直流電源１０は、例えば充放電可能な直流電力源である。直流電源１０としては、例えば、数１００Ｖの端子電圧を有するリチウムイオン組電池、ニッケル水素組電池又はキャパシタ等を用いることができる。なお、直流電源１０が「第１のバッテリ」の一例に相当する。
【００２４】
ここで、直流電源１０及びインバータ１２，１３のそれぞれの電源ラインについて、高電圧側を正極側母線、低圧側を負極側母線と呼ぶこととすると、直流電源１０のプラス端子に接続されるラインが直流電源１０側の正極側母線であり、直流電源１０のマイナス端子に接続されるラインが直流電源１０側の負極側母線である。同様に、インバータ１２，１３の高電圧側電源ラインがインバータ１２，１３側の正極側母線であり、低電圧側電源ラインがインバータ１２，１３側の負極側母線である。図１に示すように、直流電源１０側の負極側母線とインバータ１２，１３側の負極側母線とは相互に接続されて共通の負極側母線とされる。
【００２５】
直流電源１０とコンバータ１１との間に、システムリレーＳＭＲＢ，ＳＭＲＧが設けられている。システムリレーＳＭＲＢ，ＳＭＲＧは、直流電源１０からコンバータ１１及びインバータ１２，１３に対する電力供給経路を導通又は遮断する。具体的には、システムリレーＳＭＲＢは、直流電源１０のプラス端子と正極側母線との間に接続されている。システムリレーＳＭＲＧは、直流電源１０のマイナス端子と負極側母線との間に接続されている。システムリレーＳＭＲＢ，ＳＭＲＧはそれぞれ、制御装置４０からの信号ＳＥに従って導通又は遮断される。
【００２６】

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システムリレーＳＭＲＢ，ＳＭＲＧとコンバータ１１との間において、正極側母線と負極側母線との間にコンデンサＣ１が設けられている。コンデンサＣ１は、直流電源１０からコンバータ１１に供給される電圧（電圧ＶＬ）を平滑化し、電圧ＶＬを保持する容量素子である。同様に、コンバータ１１とインバータ１２，１３との間において、正極側母線と負極側母線との間にコンデンサＣ２が設けられている。コンデンサＣ２は、コンバータ１１から供給される電圧（電圧ＶＨ）を平滑化し、電圧ＶＨを保持する容量素子である。

【００２７】

コンバータ１１は、制御装置４０からのスイッチング制御信号S_{cyy}に基づいて、直流電源１０側の電圧ＶＬとインバータ１２，１３側の電圧ＶＨとの間の電圧変換を行う。コンバータ１１は、一例として昇降圧チョッパ回路によって構成され、リアクトルＬと、相互に直列に接続される２つのスイッチング素子Ｑ１、Ｑ２と、２つのスイッチング素子Ｑ１，Ｑ２のそれぞれに並列に逆接続されるダイオードＤ１，Ｄ２とを含んで構成されている。

【００２８】

リアクトルＬはインダクタンス値Ｌを有する素子であって、電流Ｉが流れることで、（LI^2）／２の電磁エネルギーを蓄積でき、また、この蓄積された電磁エネルギーを放出することができる。リアクトルＬの一方側端子は、直流電源１０の一方側端子と接続され、リアクトルＬの他方側端子は、２つのスイッチング素子Ｑ１，Ｑ２が相互に直列に接続されている接続点に接続される。

【００２９】

２つのスイッチング素子Ｑ１，Ｑ２は、リアクトルＬに対し、電磁エネルギーを蓄積させ又は放出させることで、直流電源１０側とインバータ１２，１３側との間において電圧変換を行いながら電力をやり取りさせる機能を有する。２つのスイッチング素子Ｑ１，Ｑ２の一方側のスイッチング素子Ｑ１は、リアクトルＬの他方側端子とインバータ１２，１３の正極側母線との間に設けられ、他方側のスイッチング素子Ｑ２は、リアクトルＬの他方側端子とインバータ１２，１３の負極側母線との間に設けられる。

【００３０】

２つのスイッチング素子Ｑ１，Ｑ２を区別するとき、インバータ１２，１３の正極側母線に接続される素子を上アーム側スイッチング素子と称し、共通の負極側母線に接続される素子を下アーム側スイッチング素子と称することができる。図１に示す例では、スイッチング素子Ｑ１が上アーム側スイッチング素子に該当し、スイッチング素子Ｑ２が下アーム側スイッチング素子に該当する。スイッチング素子Ｑ１，Ｑ２としては、例えばＩＧＢＴ（Ｉｎｓｕｌａｔｅｄ　Ｇａｔｅ　Ｂｉｐｏｌａｒ　Ｔｒａｎｓｉｓｔｏｒ）が用いられる。

【００３１】

コンバータ１１を昇圧回路として機能させる場合、上アーム側のスイッチング素子Ｑ１をオフにした状態で、下アーム側のスイッチング素子Ｑ２をオン／オフさせる。すなわち、下アーム側のスイッチング素子Ｑ２がオンの状態においては、直流電源１０から流れる電流は、リアクトルＬ、下アーム側のスイッチング素子Ｑ２を経由して直流電源１０に戻るループを形成する。このループを電流が流れている間に、磁気エネルギーがリアクトルＬに蓄積される。そして、下アーム側のスイッチング素子Ｑ２をオフにすると、直流電源１０から流れる電流は、リアクトルＬ、ダイオードＤ１を経由してインバータ１２，１３側に流れ、直流電源１０に戻るループを形成する。この間には、直流電源１０からの電気エネルギーに加え、リアクトルＬに蓄積された磁気エネルギーがインバータ１２，１３側に供給されるので、インバータ１２，１３側に供給される電圧は昇圧される。

【００３２】

一方、コンバータ１１を降圧回路として機能させる場合、下アーム側のスイッチング素子Ｑ２をオフにした状態で、上アーム側のスイッチング素子Ｑ２をオン／オフさせる。すなわち、上アーム側のスイッチング素子Ｑ１がオンの状態においては、インバータ１２，１３側から回生される電流は、上アーム側のスイッチング素子Ｑ１、リアクトルＬ、直流

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電源１０へと流れ、インバータ１２，１３側に戻るループを形成する。このように、上アーム側のスイッチング素子Ｑ１がオン状態の場合、コンバータ１１の直流電源１０側の電圧ＶＬと、コンバータ１１のインバータ１２，１３側の電圧ＶＨとが同一となる。また、上アーム側のスイッチング素子Ｑ１がオフ状態の場合、リアクトルＬ、直流電源１０、ダイオードＤ２からなるループを形成し、リアクトルＬに蓄積された磁気エネルギーが直流電源１０に回生される。

【００３３】

電圧センサ１４はコンデンサＣ１の両端の電圧ＶＬを検出し、電圧ＶＬの値を制御装置４０に出力する。また、電圧センサ１５はコンデンサＣ２の両端の電圧ＶＨを検出し、電圧ＶＨの値を制御装置４０に出力する。

【００３４】

また、インバータ１２の各相アームとモータジェネレータＭＧ１の各相コイルとを結ぶ配線には、少なくとも２相において電流を検出する図示しない電流センサが設けられている。同様に、インバータ１３の各相アームとモータジェネレータＭＧ２の各相コイルとを結ぶ配線には、少なくとも２相において電流を検出する図示しない電流センサが設けられている。電流センサによって検出された電流値は、制御装置４０に出力される。

【００３５】

また、モータジェネレータＭＧ１，ＭＧ２のそれぞれには、モータジェネレータＭＧ１，ＭＧ２のそれぞれのロータの回転角を検出するレゾルバ等の図示しない位置センサが設けられている。位置センサによって検出された回転角を示すデータは、制御装置４０に出力される。

【００３６】

補機バッテリ２０には、直流電源１０よりも電圧が低い充放電可能なバッテリが用いられ、例えば、１２Ｖ等の充放電可能なバッテリが用いられる。補機バッテリ２０には、図示しない補機が接続されている。この補機には、例えば、車両に搭載されるエアーコンディショナー、車内灯、カーナビゲーションシステム等が含まれる。補機バッテリ２０は、ＤＣ／ＤＣコンバータ３０を介して直流電源１０から電力を受けて充電され得る。なお、補機バッテリ２０が「第２のバッテリ」の一例に相当する。

【００３７】

ＤＣ／ＤＣコンバータ３０は、システムリレーＳＭＲＢ，ＳＭＲＧとコンバータ１１との間において、正極側母線と負極側母線との間に接続されている。ＤＣ／ＤＣコンバータ３０は、制御装置４０の制御の下で動作する複数のスイッチング素子を含んで構成されている。ＤＣ／ＤＣコンバータ３０は、直流電源１０から供給された電圧を所定の直流電圧に降圧して補機バッテリ２０又は補機に供給する。

【００３８】

制御装置４０は、運転状況に応じて各部の動作を制御することにより、モータジェネレータＭＣ１、ＭＣ２による走行モードを、モータ走行、充電走行又はエンジン・モータ走行等の間で切り替える。例えば、制御装置４０は、スイッチング制御信号S_{CSV}をコンバータ１１に出力してスイッチング素子Ｑ１，Ｑ２のスイッチング動作を制御することで、コンバータ１１を昇圧回路又は降圧回路として機能させる。また、モータジェネレータＭＧ１を駆動する場合、制御装置４０は、電圧ＶＨ、トルク指令値及びモータジェネレータＭＧ１の電流値等に基づいてスイッチング制御信号S_{INV}を生成し、スイッチング制御信号S_{INV}をインバータ１２に出力してインバータ１２のスイッチング動作を制御する。同様に、モータジェネレータＭＧ２を駆動する場合、制御装置４０は、電圧ＶＨ、トルク指令値及びモータジェネレータＭＧ２の電流値等に基づいてスイッチング制御信号S_{INV}を生成し、スイッチング制御信号S_{INV}をインバータ１３に出力してインバータ１３のスイッチング動作を制御する。また、制御装置４０は、システムリレーＳＭＲＢ，ＳＭＲＧをオン／オフするための信号ＳＥを生成してシステムリレーＳＭＲＢ，ＳＭＲＧに出力する。

【００３９】

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コンバータ１１の故障を検出するコンバータ故障検出装置は、ＤＣ／ＤＣコンバータ３０と制御装置４０とを含み、コンバータ１１の上アーム側のスイッチング素子Ｑ１の短絡故障を検出する。

【００４０】

次に、図２及び図３を参照して、本実施形態に係るコンバータ故障検出装置の動作について説明する。図２は、本実施形態に係るコンバータ故障検出装置による動作の一例を示すフローチャートである。図３は、コンバータ１１の直流電源１０側の電圧ＶＬとインバータ１２，１３側の電圧ＶＨとの時間変化を示すグラフである。図３に示す２つのグラフのうち、上側のグラフは電圧ＶＨの時間変化を示し、下側のグラフは電圧ＶＬの時間変化を示す。横軸の時間は、図２に示す処理の各ステップに対応する。

【００４１】

まず、制御装置４０は、車両が停車中であることを検出した場合（Ｓ０１，Ｙｅｓ）、信号ＳＥをシステムリレーＳＭＲＢ，ＳＭＲＧに出力し、システムリレーＳＭＲＢ，ＳＭＲＧをオンする（Ｓ０２）。例えば、制御装置４０は、モータジェネレータＭＧ１，ＭＧ２に設けられたレゾルバ等の位置センサから回転角を示すデータを受け、当該回転角に基づいて車両の停車を検出する。

【００４２】

次に、制御装置４０は、スイッチング制御信号S_{CNV}をコンバータ１１に出力し、上アーム側のスイッチング素子Ｑ１をオンするとともに、下アーム側のスイッチング素子Ｑ２をオフする（Ｓ０３）。上アーム側のスイッチング素子Ｑ１がオン状態の場合、コンバータ１１の直流電源１０側の電圧ＶＬ（コンデンサＣ１の両端の電圧ＶＬ）と、コンバータ１１のインバータ１２，１３側の電圧ＶＨ（コンデンサＣ２の両端の電圧ＶＨ）とが同一となる。図３に示すように、Ｓ０３に対応する時間においては、電圧ＶＬ及び電圧ＶＨは同一となり、例えば直流電源１０が供給する電圧Ｅ１となる。

【００４３】

次に、制御装置４０は、スイッチング制御信号S_{CNV}をコンバータ１１に出力し、下アーム側のスイッチング素子Ｑ２をオフにした状態で、上アーム側のスイッチング素子Ｑ１をオフする（Ｓ０４）。これにより、２つのスイッチング素子Ｑ１，Ｑ２がともにオフとなる。Ｓ０４に対応する時間においては、図３に示すように、電圧ＶＬ及び電圧ＶＨは変化せずに同一であり、電圧Ｅ１となっている。

【００４４】

次に、制御装置４０は、信号ＳＥをシステムリレーＳＭＲＢ，ＳＭＲＧに出力し、システムリレーＳＭＲＢ，ＳＭＲＧをオフする（Ｓ０５）。これにより、コンバータ１１とＤＣ／ＤＣコンバータ３０とが接続された状態で、直流電源１０とコンバータ１１との接続が解除され、直流電源１０からコンバータ１１への電力供給が遮断される。また、直流電源１０とＤＣ／ＤＣコンバータ３０との接続も解除され、直流電源１０からＤＣ／ＤＣコンバータ３０への電力供給が遮断される。

【００４５】

次に、制御装置４０は、スイッチング制御信号をＤＣ／ＤＣコンバータ３０に出力し、ＤＣ／ＤＣコンバータ３０を作動させる（Ｓ０６）。これにより、コンデンサＣ１からＤＣ／ＤＣコンバータ３０を介して補機バッテリ２０に電圧が供給され、図３に示すように、Ｓ０６に対応する時間以降，コンバータ１１の直流電源１０側の電圧ＶＬ（コンデンサＣ１の両端の電圧ＶＬ）は徐々に低下する。

【００４６】

そして、制御装置４０は、電圧ＶＬと電圧ＶＨとを比較し、電圧ＶＬと電圧ＶＨとの大小関係に基づいて、上アーム側のスイッチング素子Ｑ１の故障を検出する（Ｓ０７）。例えば、電圧ＶＨと電圧ＶＬとの大小関係が「電圧ＶＨ＞電圧ＶＬ」となる場合（Ｓ０７，ＹＥＳ）、制御装置４０は、上側アームのスイッチング素子Ｑ１は正常に機能していると判定する。一方、電圧ＶＨと電圧ＶＬとの大小関係が「電圧ＶＨ＞電圧ＶＬ」とならない場合（Ｓ０７，ＮＯ）、制御装置４０は、上側アームのスイッチング素子Ｑ１が短絡して

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いると判定する。

【００４７】

例えば、図３に示すように、Ｓ０６に対応する時間以降においても電圧ＶＨが一定となって「電圧ＶＨ＞電圧ＶＬ」の関係が成立する場合（Ｓ０７，ＹＥＳ）、制御装置４０は、上側アームのスイッチング素子Ｑ１は正常に機能していると判定する。一方、Ｓ０６に対応する時間以降に電圧ＶＨが低下して「電圧ＶＨ＞電圧ＶＬ」の関係が成立しない場合（Ｓ０７，ＮＯ）、制御装置４０は、上側アームのスイッチング素子Ｑ１が短絡していると判定する。

【００４８】

すなわち、車両が停車中の状態で、Ｓ０３にて電圧ＶＨと電圧ＶＬとを一定の電圧Ｅ１にした後、２つのスイッチング素子Ｑ１，Ｑ２をオフにしているため、直流電源１０とコンバータ１１との間に設けられたＤＣ／ＤＣコンバータ３０を作動させても、インバータ１２，１３側の電圧ＶＨは低下せずに一定の電圧Ｅ１に保たれるはずである。Ｓ０６にてＤＣ／ＤＣコンバータ３０を作動させた場合、直流電源１０からの電力供給が遮断されているため、Ｓ０６に対応する時間以降、電圧ＶＬは徐々に低下する。従って、電圧ＶＨが一定に保たれていれば、電圧ＶＬよりも電圧ＶＨは高圧となって「電圧ＶＨ＞電圧ＶＬ」の関係は維持されるはずである。それにもかかわらず、「電圧ＶＨ＞電圧ＶＬ」の関係が成立しないということは、インバータ１２，１３側の電圧ＶＨが低下していることになる。すなわち、上アーム側のスイッチング素子Ｑ１が短絡し、コンデンサＣ２からコンバータ１１の直流電源１０側に電圧が供給されていることになる。このように、電圧ＶＨと電圧ＶＬとの大小関係に基づいて、上アーム側のスイッチング素子Ｑ１の短絡故障を検出することができる。

【００４９】

また、制御装置４０は、Ｓ０６に対応する時間以降、電圧ＶＬとともに電圧ＶＨが電圧Ｅ１から低下した場合、上アーム側のスイッチング素子Ｑ１が短絡していると判定し、電圧ＶＨが一定の場合、上アーム側のスイッチング素子Ｑ１は正常に機能していると判定してもよい。

【００５０】

制御装置４０は、スイッチング素子Ｑ１の短絡故障を検出した場合、コンバータ１１の故障をドライバーに報知するための異常検出信号を出力してもよいし、コンバータ１１及びインバータ１２，１３のスイッチング動作を停止させることで車両の駆動を禁止してもよい。

【００５１】

以上のように、本実施形態に係るコンバータ故障検出装置によると、車両の停車中にコンバータ１１の故障を検出するための状況を積極的に作り出し、コンバータ１１の故障を検出することが可能となる。これにより、コンバータ１１の故障を検出するための状況に車両システムがなるのを待たなくても、車両の停車中にコンバータ１１の故障を検出することが可能となる。

【００５２】

また、本実施形態に係るコンバータ故障検出装置によると、昇圧回路として機能するようにコンバータ１１を作動させなくても、コンバータ１１の故障を検出することができる。従って、昇圧が不要な状況において昇圧を行わずに済むため、燃費の低下及びドライバビリティの低下を抑制することが可能となる。

【００５３】

上述した制御装置４０は、一例としてハードウェア資源とソフトウェアとの協働により実現され、例えば電子制御ユニット（ＥＣＵ：Ｅｌｅｃｔｒｏｎｉｃ　Ｃｏｎｔｒｏｌ　Ｕｎｉｔ）である。具体的には、制御装置４０の機能は、記録媒体に記録されたプログラムがメモリに読み出されてＣＰＵ（Ｃｅｎｔｒａｌ　Ｐｒｏｃｅｓｓｉｎｇ　Ｕｎｉｔ）等のプロセッサにより実行されることによって実現される。上記のプログラムは、コンピュータ読み取り可能な記録媒体に記録されて提供されることも可能であるし、データ信号と

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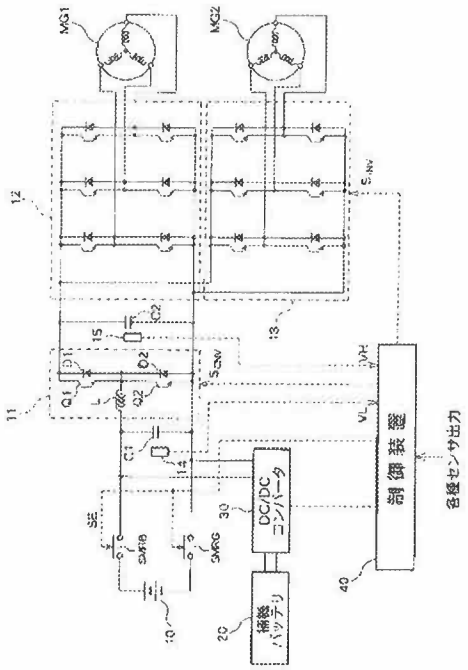
して通信により提供されることも可能である。なお、制御装置４０は、ハードウェアのみにより実現されてもよい。また、制御装置４０は、物理的に１つの装置により実現されてもよいし、複数の装置により実現されてもよい。

【符号の説明】

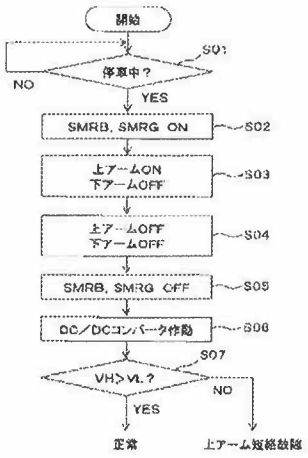
【００５４】

１０　直流電源、１１　コンバータ、１２，１３　インバータ、１４，１５　電圧センサ、２０　補機バッテリ、３０　ＤＣ／ＤＣコンバータ、４０　制御装置、Ｃ１，Ｃ２　コンデンサ、Ｄ１，Ｄ２　ダイオード、Ｌ　リアクトル、Ｑ１，Ｑ２　スイッチング素子、ＭＧ１，ＭＧ２　モータジェネレータ。

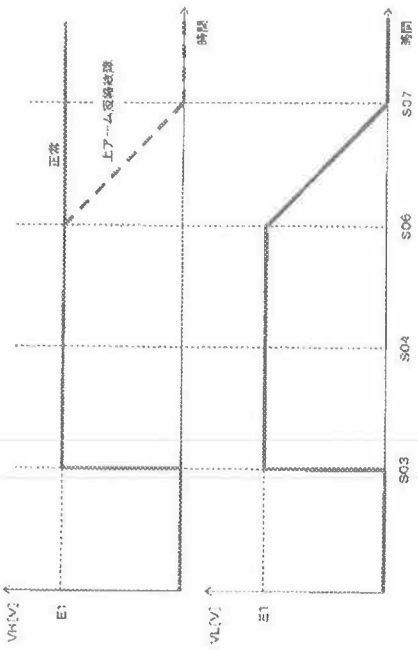
【図１】



【図２】



【図３】



Electronic Acknowledgement Receipt	
EFS ID:	35342157
Application Number:	15799045
International Application Number:	
Confirmation Number:	9433
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	273252-8
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Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	273252US8_IDS.pdf	1057023 58a3d09eeea80a159e82b3cb04eb273bb365b223	no	4

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2	Foreign Reference	273252US8_JP2007274785.pdf	6975286 3ad9a9076c5a30495ab0369dc596c9bd3ab fbbb7	no	12
Warnings:					
Information:					
3	Foreign Reference	273252US8_JP2008005625.pdf	7740075 722722264ddec184df266cb28aa86ebcdab a752a	no	14
Warnings:					
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4	Foreign Reference	273525US8_JP2008312380.pdf	9915582 99de250dfbc0c1725f4fc99b5cd1bba82412 2409	no	17
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5	Foreign Reference	273252US8_JP2009148139.pdf	4620011 c19f4476f034fc35b6bc738393249151b145d c0dd	no	19
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7	Foreign Reference	273252US8_JP2013188106.pdf	8861370 a1f3ea6292c3a50c31595654eb70bdeaa3e 6e957	no	13
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8	Non Patent Literature	273252US8_NPL1.pdf	269188 bd3bf5a67b2d05d7c1cc83cddee98178dd0564f8d	no	2
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/799,045	Filing Date 10/31/2017	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	02/20/2019	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 22	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ANITA JOHNSON/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15799045
Filing Date	2017-10-31
First Named Inventor	Robert Dean King
Art Unit	2837
Examiner Name	GLASS, ERICK DAVID
Attorney Docket Number	273252-8

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050082992	A1	2005-04-21	Aizawa et al.	

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-8

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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15799045
	Filing Date	2017-10-31
	First Named Inventor	Robert Dean King
	Art Unit	2837
	Examiner Name	GLASS, ERICK DAVID
	Attorney Docket Number	273252-8

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-02-20
Name/Print	Craig M. Drachtman	Registration Number	73016

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	15799045
Filing Date:	31-Oct-2017
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Filer:	Craig Michael Drachtman/Colleen Maroney
Attorney Docket Number:	273252-8
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1300	1300
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt	
EFS ID:	35197683
Application Number:	15799045
International Application Number:	
Confirmation Number:	9433
Title of Invention:	VEHICLE PROPULSION SYSTEM WITH MULTI-CHANNEL DC BUS AND METHOD OF MANUFACTURING SAME
First Named Inventor/Applicant Name:	Robert Dean King
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	273252-8
Receipt Date:	20-FEB-2019
Filing Date:	31-OCT-2017
Time Stamp:	10:17:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1300
RAM confirmation Number	022019INTEFSW10180700
Deposit Account	505522
Authorized User	Colleen Maroney
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	273252_8_RCE.pdf	1350161 d0eaac318e94bcf131154284d34d5e4f4ac36eed	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	273252_8_IDS.pdf	1034499 f7d529d0f15a7b99b73b6013d07aad82601f5d58	no	4
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30607 f3f576383ff84fef9ea5a4592cca4fd4abbb60fc	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2415267		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15799045	Filing Date	2017-10-31	Docket Number (if applicable)	273252-8	Art Unit	2837
First Named Inventor	Robert Dean King			Examiner Name	GLASS, ERICK DAVID		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other After Final Response filed January 22, 2019

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 505522

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

EFS - Web 2.1.16

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Signature of Registered U.S. Patent Practitioner			
Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2019-02-20
Name	Craig M. Drachtman	Registration Number	73016

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/799,045	10/31/2017	Robert Dean King	273252-8	9433

131278 7590 02/01/2019

GE GLOBAL PATENT OPERATION
GE VENTURES-LICENSING (ME 131278)
901 MAIN AVENUE
NORWALK, CT 06851

EXAMINER	
GLASS, ERICK DAVID	

ART UNIT	PAPER NUMBER
2837	

NOTIFICATION DATE	DELIVERY MODE
02/01/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gedocket@meagheremanuel.com
gpo.mail@ge.com