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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Jian Zhou
Art Unit	
Examiner Name	
Attorney Docket Number	256975-US-11

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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	7963353	B2	2011-06-21	Tatematsu et al.	
	2	8639423	B2	2014-01-28	Shaaf et al.	
	3	7595597	B2	2009-09-29	King; Robert Dean	
	4	7583053	B2	2009-09-01	Kamohara; Hideaki	
	5	7764051	B2	2010-07-27	Ishikawa; Tetsuhiro	
	6	9145131	B2	2015-09-29	Watanabe; Kenta	
	7	5549172		1996-08-27	MUTOH	
	8	7595597	B2	2009-09-29	KING et al.	

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	9	7839013	B2	2010-11-23	NAKAMURA et al.	
	10	7965510	B2	2011-06-21	SUZUKI et al.	
	11	8138720	B2	2012-03-20	SNYDER et al.	
	12	8016061	B2	2011-09-13	JEON et al.	
	13	7688604	B2	2010-03-30	OYOBE et al.	English Family Member of CN101208855A
	14	6608396	B2	2003-08-19	Downer et al.	
	15	7723932	B2	2010-05-25	King et al.	
	16	7285926	B2	2007-10-23	McGarry et al.	
	17	8415909	B2	2013-04-09	Ramamurthy et al.	
	18	5343970		1994-09-06	Severinsky	
	19	6209672	B1	2001-04-03	Severinsky	

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	20	6554088	B2	2003-04-29	Severinsky et al.	
	21	6583599	B1	2003-06-24	Phillips et al.	
	22	8535200	B2	2013-09-17	Vyas et al.	
	23	6271648	B1	2001-08-07	Miller	
	24	6118237	A	2000-09-12	Kikuchi et al.	
	25	7594491	B2	2009-09-29	Yanagida et al.	
	26	8395355	B2	2013-03-12	Kaita et al.	
	27	8469849	B2	2013-06-25	Kruger	
	28	6691809	B2	2004-02-17	Hata et al.	
	29	8387730	B2	2013-03-05	Bouchon	
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	31	7207915	B2	2007-04-24	Oshidari et al.	
	32	7063637	B2	2006-06-20	Yamauchi et al.	
	33	10374529	B2	2019-08-06	Zhou et al.	
	34	7923866	B2	2011-04-12	Ichikawa	

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	1	20090224720	A1	2009-09-10	Oyobe; Hichirosai	
	2	20120091930	A1	2012-04-19	Takahashi; Kenji	
	3	20130041543	A1	2013-02-14	Takayanagi; Hiroyuki	
	4	20110057588	A1	2011-03-10	Rineh; Ghodratollah Esmaeili	
	5	20080218104	A1	2008-09-11	LUKIC et al.	

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	Application Number	
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	First Named Inventor	Jian Zhou
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	Examiner Name	
	Attorney Docket Number	256975-US-11

	6	20090242289	A1	2009-10-01	MURTY	
	7	20100222953	A1	2010-09-02	TANG	
	8	20120010041	A1	2012-01-12	SOLIMAN et al.	
	9	20040263099	A1	2004-12-30	MASLOV et al.	
	10	20120010771	A1	2012-01-12	KATO et al.	
	11	20120292985	A1	2012-11-22	SAKAI	
	12	20080197810	A1	2008-08-21	Ishikawa et al.	
	13	20090115375	A1	2009-05-07	Iida	
	14	20100240491	A	2010-09-23	Vyas et al.	
	15	20050082992	A1	2005-04-21	Miller et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jian Zhou
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	Examiner Name	
	Attorney Docket Number	256975-US-11

	17	20110111909	A1	2011-05-12	Kim et al.	
	18	20120103749	A1	2012-05-03	Kimura et al.	
	19	20030150352	A1	2003-08-14	Kumar	
	20	20040069548	A1	2004-04-15	Kira et al.	
	21	20060169548	A1	2006-08-03	Corbett et al.	
	22	20100219794	A1	2010-09-02	Sugimoto et al.	
	23	20110101915	A1	2011-05-05	Mitsutani	
	24	20060250902	A1	2006-11-09	Bender et al.	
	25	20100051367	A1	2010-03-04	Yamada et al.	
	26	20100019734	A1	2010-01-28	Oyobe et al.	
	27	20100227722	A1	2010-09-09	Conlon	

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	First Named Inventor	Jian Zhou
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	Examiner Name	
	Attorney Docket Number	256975-US-11

	28	20100219777	A1	2010-09-02	Slettevoli	
	29	20090134820	A1	2009-05-28	Sugiyama	
	30	20140152225	A1	2014-06-05	Ahou	

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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]
	1	20110074370	KR	A	2011-06-30	Hyosung Corp.	with English Abstract Only	
	2	102010044497	DE	A	2012-03-08	Magna E Car Systems GmbH & Co.	with English Abstract Only	
	3	101237154	CN	A	2008-08-06	TSINGHUA UNIVERSITY		
	4	101524967	CN	A	2009-09-09	HYUNDAI MOTOR COMPANY	See English Family member US8016061B2	
	5	101844511	CN	A	2010-09-29	BEIQI FUTIAN AUTOMOBILE CO., LTD		
	6	102009023340	DE	A1	2011-02-03	DAIMLER AG		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Jian Zhou
	Art Unit	
	Examiner Name	
	Attorney Docket Number	256975-US-11

	7	2117106	EP	A1	2009-11-11	TOYOTA MOTOR CO LTO		
	8	2439120	EP	A1	2012-04-11	TOYOTA MOTOR CO LTO		
	9	2011001251	WO	A2	2011-01-06	TOYOTA MOTOR CO LTO		
	10	101208855	CN	A	2008-06-25	TOYOTA MOTOR CO., LTD et al.	See English Family Member US7688604B2	
	11	200023313	JP		2000-01-21	Suzuki Motor Corporation		
	12	2006042510	JP	A	2006-02-09	Nissan Motor Co. Ltd.	With English Abstract	
	13	2000295711	JP	A	2010-10-20	FUJI HEAVY IND LTD	With English Abstract	
	14	2005297729	JP	A	2005-10-27	TOYOTA MOTOR CORP	With English Abstract	
	15	2002078106	JP	A	2002-03-15	TOYOTA MOTOR CORP	English Abstract Only	
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	First Named Inventor	Jian Zhou
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	Examiner Name	
	Attorney Docket Number	256975-US-11

	18	2002067723	JP	A	2002-03-08	TOYOTA MOTOR CORP	English Abstract Only	
	19	2002078110	JP	A	2002-03-15	TOYOTA MOTOR CORP	English Abstract Only	
	20	2010130828	JP	A	2010-06-10	HITACHI LTD	With English Abstract	
	21	2004-260904	JP	A	2004-09-16	TOYOTA MOTOR CORP	With English Abstract Only	
	22	2008-312382	JP	A	2008-12-25	TOYOTA MOTOR CORP	With English Abstract Only	
	23	2003333707	JP	A	2003-11-21	TOYOTA MOTOR CORP		X
	24	2006280170	JP	A	2006-10-12	TOSHIBA CORP		☐
	25	2007143374	JP	A	2007-06-07	TOYOTA MOTOR CORP		☐
	26	2013-203109	JP	A	2013-10-07	TOYOTA MOTOR CORP	Abstract Only	☐
	27	2007-325474	JP	A	2007-12-13	TOYOTA MOTOR CORP	Abstract Only	☐
	28	2010-206971	JP	A	2010-09-16	TOYOTA CENTRAL RES & DEV TOYOTA MOTOR CORP	Abstract Only	☐

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	Examiner Name	
	Attorney Docket Number	256975-US-11

	29	2013-207831	JP	A	2013-10-07	TOYOTA MOTOR CORP	Abstract Only	☐
	30	2009-508763	JP	A	2009-03-05	TOYOTA MOTOR CORP	Abstract Only	☐
	31	102007056722	JP	A	2008-07-10	GM GLOBAL TECH OPERATIONS INC [US]	Abstract Only	☐

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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	NORTHCOTT et al., "Electromagnetic Transient Simulation of Hybrid Electric Vehicles", Industrial Electronics, 2007. ISIE 2007. IEEE International Symposium on, Pages 833-838, 4-7 June 2007.	
	2	NAPOLI et al., "Multiple-Input DC-DC Power Converter for Power-Flow Management in Hybrid Vehicles", Conference Record of the IEEE Industry Applications Conference. IAS Annual Meeting, Pittsburgh, Pennsylvania, USA, Volume No.3, pp. 1578-1585, 13 October 2002.	
	3	Unofficial English Translation of Chinese Office Action issued in connection with corresponding CN Application No. 201210509493.2 on July 13, 2015.	
	4	A copy of European Search Report and Opinion issued in connection with corresponding EP Application No. 13195375.4 on December 21, 2015.	
	5	Unofficial English Translation of Chinese Office Action issued in connection with corresponding CN Application No. 201210509493.2 on March 11, 2016.	
	6	Toyota Prius, "Plug-in Hybrid Gasoline-Electric Hybrid Synergy Drive", Hybrid Vehicle Dismantling Manual, 74 pages, 2011.	

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	7	PCED enUSA 2010 Fusion Milan Hybrid, Description and Operation, pages 1-121, 2009.	
	8	Hybrid/Battery Control: Hybrid Control System: Details (2010 Prius PHV), 9-23-2011, https://techinfo.toyota.com/t3Portal/resources/jsp/siviewer/index.jsp?dir=ncf/NM14C0U&href=xtml/RM000004273004X.html&locale=en&model=Prius%20PH, pages 1-65.	
	9	Hybrid/Battery Control: Plug-In Charge Control System: Details; 2012 MY Prius PHV [01/2012-] https://techinfo.toyota.com/t3Portal/resources/jsp/siviewer/index.jsp?dir=ncf/NM19G0U&href=xtml/RM000005417000X.html&locale=en&model=Prius%20PH, pages 1-9.	
	10	Copy of English Translation of Japanese Office Action issued in connection with corresponding JP Application No. 2018-089123 on March 20, 2019.	
	11	Unofficial English Translation of Japanese Office Action issued in connection with corresponding JP Application No. 2013-246847 on September 5, 2017.	
	12	Copy of Notification of Reasons for Refusal for corresponding JP Application No.: 2019-069591dated January 14, 2020.	

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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.

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	First Named Inventor	Jian Zhou
	Art Unit	
	Examiner Name	
	Attorney Docket Number	256975-US-11

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.

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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)	2020-05-04
Name/Print	Craig M. Drachtman	Registration Number	73016

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Jian Zhou et al **Application No.:** Not yet assigned **Confirmation No.:** Not yet assigned **Filed:** Herewith **For:** Electric Drive System and Energy Management Method **Group:** Not yet assigned **Examiner:** Not yet assigned	**Our File:** 256975-US-11 **Date:** May 4, 2020

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to MPEP 609.02, Applicant respectfully requests the Examiner to consider all the references submitted, cited, or otherwise considered during the prosecution of all the ancestor applications listed on the Application Data Sheet of the present application. A complete PTO/SB/08 form is attached. The Applicant does not plan to submit references unless explicitly requested by the Examiner.

Respectfully submitted,
General Electric Company

By: /Craig M. Drachtman/
Craig M. Drachtman
Registration No. 73,016

Meagher Emanuel
Laks Goldberg & Liao, LLP
One Palmer Square, Suite 325
Princeton, NJ 08542
609-454-3500

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Examiner Name	
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I am the:

☐ Applicant/inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Assignee of Record

Signature	/ptd47323/	Date	April 7, 2016
Name	Peter T. DiMauro	Telephone	203-366-7465
Title and Company	Senior Patent Agent and Authorized Signatory for General Electric Company		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Craig Michael Drachtman/Colleen Maroney
Attorney Docket Number:	256975-US-11

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1720**

Electronic Acknowledgement Receipt

EFS ID:	39344238
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	04-MAY-2020
Filing Date:	
Time Stamp:	16:23:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1720
RAM confirmation Number	E202054G24149338
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	Application Data Sheet	256975US11_ADS.pdf	1256797 b5c6e8218721de370cc8b867be481c9aa510a2b4	no	10
Warnings:					
Information:					
2		256975US11_CONApplication.pdf	23781022 0167a14096776e83f3e5cf8f8536f979b519dd5e	yes	24

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	19
	Claims	20	23
	Abstract	24	24

Warnings:					
Information:					
3	Drawings-only black and white line drawings	256975US11_Draw.pdf	2227652 30b9f25cba15c6e003f7b4372d5e20c99adcb2dd	no	10
Warnings:					
Information:					
4	Oath or Declaration filed	256975US11_Decl.pdf	6408447 65f1abfebe67632de977c66ec2f88a7e9a46a175	no	7
Warnings:					
Information:					
5	Information Disclosure Statement (IDS) Form (SB08)	256975US11_IDS.pdf	1038641 b592867d45e7cf9b8c8a9bc470bc86c1ab8d5dc4	no	13

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6	Transmittal Letter	256975US11_IDSConsiderPrior.pdf	64081 6e7eb1d9223b735298567e903bb94ac29d7a6e88	no	1
Warnings:					
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7	Power of Attorney	256975US11_POA.pdf	718383 cef3c559c535fa7620adadd20cf5b287062cead8	no	1
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	34928 9ee421669353748da2794d8709e6f4affd5981f8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	35529951		

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jian		Zhou	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Shanghai	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	General Electric Company
Address 2	1 River Road
City	Schenectady
State/Province	NY
Postal Code	12345
Country [i]	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Fei		Xu	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Shanghai	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	General Electric Company
Address 2	1 River Road
City	Schenectady
State/Province	NY
Postal Code	12345
Country [i]	US

Inventor 3 Remove

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Dong		Liu	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Shanghai	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	General Electric Company
Address 2	1 River Road

City	Schenectady	State/Province	NY
Postal Code	12345	**Country** [i]	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Hai		Qiu	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Shanghai	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	General Electric Company
Address 2	1 River Road

City	Schenectady	State/Province	NY
Postal Code	12345	**Country** [i]	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Pengju		Kang	

Residence Information (Select One) ● US Residency ◯ Non US Residency Active US Military Service

City	Yorktown Heights	State/Province	NY	Country of Residence [i]	US

Mailing Address of Inventor:

Address 1	General Electric Company
Address 2	1 River Road

City	Schenectady	State/Province	NY
Postal Code	12345	**Country** [i]	US

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	131278		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Electric Drive System and Energy Management Method		
Attorney Docket Number	256975-US-11	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	10	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	131278		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status		Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16433348	2019-06-06

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16433348	Continuation of	15453218	2017-03-08	10374529	2019-08-06

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15453218	Continuation of	14094086	2013-12-02	9800182	2017-10-24

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201210509493.2	CN	2012-12-03	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

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 Remove

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		
Mailing Address Information For Applicant:			
Address 1	1 River Road		
Address 2			
City	Schenectady	**State/Province**	NY
Country	US	Postal Code	12345
Phone Number		Fax Number	
Email Address			

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

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	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

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.

Remove

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

Organization Name	General Electric Company

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	1 River Road		
Address 2			
City	Schenectady	**State/Province**	NY
Country i	US	Postal Code	12345
Phone Number		Fax Number	
Email Address			

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

Signature:

Remove

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	/Craig M. Drachtman/			Date (YYYY-MM-DD)	2020-05-04
First Name	Craig	Last Name	Drachtman	Registration Number	73016

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	
Title of Invention	Electric Drive System and Energy Management Method	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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 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.

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 CooperationTreaty.

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.

ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

BACKGROUND

[0001] Embodiments of the disclosure relate generally to electric drive systems and energy management methods, useful in a variety of propulsion systems such as an electric vehicle (EV) system.

[0002] With the increased concern about energy crisis and environmental pollution caused by the fossil fuel exhaust, there is a growing interest in developing electric-powered vehicles, in which conventional fossil energy may be replaced by energy sources such as lead-acid batteries, fuel cells, flywheel batteries, etc. Electric drive system is one of the key components in the electric-powered vehicles. In the electric drive system, several kinds of AC motors such as induction motor (IM), interior permanent motor (IPM) and switched reluctance motor (SRC) are widely used for converting electric power into mechanical torques. It is desired that the propulsion system may have features of high efficiency, and high performance with low cost. These features may be achieved by choosing appropriate energy sources, appropriate AC motors, and then combining them together in an appropriate structure.

[0003] Currently, most of the electric drive systems include a single energy storage system (ESS) or a single motor, or a dual ESS with a single motor. However, on the one hand, a single ESS may not satisfy both the energy and power requirements such as low energy, slow charging rate, and a shorter life due to its own limitation of charge/discharge characteristics. On the other hand, a single motor may not work with a high efficiency across the entire operating range. It will cause problems of oversize, high cost, and low efficiency in order to meet high performances such as a short acceleration time and a long running mileage of the propulsion system.

[0004] Therefore, it is desirable to provide systems and methods to address the above-mentioned problems.

BRIEF DESCRIPTION

[0005] In accordance with one embodiment disclosed herein, an electric drive system is provided. The electric drive system includes an energy storage system (ESS), a power conversion system, an AC traction system, and an energy management system (EMS). The ESS

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
31 of 584

includes a first energy storage unit for providing or receiving a first power and a second energy storage unit for providing or receiving a second power. The power conversion system is electrically coupled to the ESS for converting an input power to an output power. The power conversion system includes a power conversion device. The power conversion device includes a first terminal coupled to the first energy storage unit, a second terminal coupled to the second energy storage unit, a third terminal, and a fourth terminal. The AC traction system is electrically coupled to the power conversion system for converting the output power of the power conversion system to mechanical torques. The AC traction system includes a first AC drive device and a second AC drive device. The first AC drive device is coupled to the third terminal of the power conversion device for providing or receiving a first mechanical torque. The second AC drive device is coupled to the fourth terminal of the power conversion device for providing or receiving a second mechanical torque. The EMS is in communication with the ESS, the AC traction system, and the power conversion system for providing control signals.

[0006] In accordance with another embodiment disclosed herein, an energy management method is provided. The energy management method includes enabling at least one of the first AC drive device and the second AC drive device based at least in part on an electric drive system speed signal. The energy management method includes enabling at least one of a first energy storage unit and a second energy storage unit. The energy management method includes sending power control signals to the power conversion system for controlling power flow paths in the electric drive system. The controlling of the power flow paths includes receiving or providing an input power by at least one of a first terminal and a second terminal of the power conversion system and providing or receiving an output power by at least one of a third terminal and a fourth terminal of the power conversion system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] These and other features, aspects, and advantages of the present disclosure will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0008] FIG. 1 is a block diagram of an electric drive system applied in a propulsion system for driving two loads in accordance with an exemplary embodiment of the present disclosure;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
32 of 584

[0009] FIG. 2 is a block diagram of an electric drive system applied in a propulsion system for driving a single load in accordance with an exemplary embodiment of the present disclosure;

[0010] FIG. 3 is a diagram of an electric drive system applied in an electric vehicle (EV) system in accordance with an exemplary embodiment of the present disclosure;

[0011] FIG. 4 is a diagram of an electric drive system with two separate power conversion devices coupled in parallel applied in an EV system in accordance with an exemplary embodiment of the present disclosure;

[0012] FIG. 5 is a diagram of an electric drive system with two separate power conversion devices coupled in series applied in an EV system in accordance with an exemplary embodiment of the present disclosure;

[0013] FIG. 6 is a flowchart of an energy management method for controlling power flow in an electric drive system in accordance with an exemplary embodiment of the present disclosure;

[0014] FIG. 7 is a flowchart of determining whether both of the first AC drive device and the second AC drive device are enabled shown in FIG. 6 in accordance with an exemplary embodiment of the present disclosure;

[0015] FIG. 8 is a flowchart of calculating two torque control signals through a torque distribution unit shown in FIG. 6 in accordance with an exemplary embodiment of the present disclosure;

[0016] FIG. 9 is a graph of torque-speed waveforms of AC traction system used in FIG. 8 in accordance with an exemplary embodiment of the present disclosure; and

[0017] FIG. 10 is a flowchart of enabling at least one of the first energy storage unit and the second energy storage unit shown in FIG. 6 in accordance with an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

[0018] In an effort to provide a concise description of these embodiments, not all features of an actual implementation are described in one or more specific embodiments. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
33 of 584

developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

[0019] Unless defined otherwise, technical and scientific terms used herein have the same meaning as is commonly understood by one of ordinary skill in the art to which this disclosure belongs. The terms "first," "second," "third," "fourth," and the like, as used herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another. Also, the terms "a" and "an" do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced items. The term "or" is meant to be inclusive and mean either any, several, or all of the listed items. The use of "including," "comprising," or "having," and variations thereof herein are meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

[0020] As used herein, the terms "may," "can," "may be," and "can be" indicate a possibility of an occurrence within a set of circumstances; a possession of a specified property, characteristic or function; and/or qualify another verb by expressing one or more of an ability, capability, or possibility associated with the qualified verb. Accordingly, usage of "may," "can," "may be," and "can be" indicate that a modified term is apparently appropriate, capable, or suitable for an indicated capacity, function, or usage, while taking into account that in some circumstances, the modified term may sometimes not be appropriate, capable, or suitable. For example, in some circumstances, an event or capacity may be expected, while in other circumstances, the event or capacity may not occur. This distinction is captured by the terms "may," "can," "may be," and "can be".

[0021] FIG. 1 illustrates a block diagram of an electric drive system 10 applied in a propulsion system (not shown) for driving two loads in accordance with an exemplary embodiment of the present disclosure. The propulsion system may include a forklift system and a crane system, for example. The electric drive system 10 includes an ESS 11, a power conversion system 13, an AC traction system 15, and an energy management system (EMS) 17. In some embodiments, the power conversion system 13 is configured for converting a DC power

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
34 of 584

generated from the ESS 11 into another DC power provided to the AC traction system 15. In some embodiments, the power conversion system 13 is configured for converting a DC power generated from the AC traction system 15 into another DC power for charging the ESS 11.

[0022] The EMS 17 is arranged to be in electrical communication with the ESS 11, the power conversion system 13, and the AC drive system 15. In some embodiments, the EMS 17 may be configured to send power control signals 171 to enable the power conversion system 13 to provide necessary DC power for the AC traction system 15. In some embodiments, the EMS 17 may be configured to send power control signals 171 to enable the power conversion system 18 to provide necessary DC power for charging the ESS 11. In some embodiments, the EMS 17 may be configured to send torque control signals 173 to the AC traction system 15 according to one or more command signals (e.g., electric drive system speed signal 25) to enable the AC traction system 15 to provide necessary mechanical torques to the load system 31.

[0023] In some embodiments, the ESS 11 includes a first energy storage unit 12 for providing or receiving a first power and a second energy storage unit 14 for providing or receiving a second power. In some embodiments, the ESS 11 may include more than two energy storage units. In some embodiments, the AC traction system 15 includes a first AC drive device 20 for providing or receiving a first mechanical torque and a second AC drive device 22 for providing or receiving a second mechanical torque. In some embodiments, the AC traction system 15 may include more than two AC drive devices.

[0024] The power conversion system 13 includes a power conversion device 18. The power conversion device 18 includes a first terminal 24 electrically coupled to the first energy storage unit 12, a second terminal 26 electrically coupled to the second energy storage unit 14, a third terminal 28 electrically coupled to the first AC drive device 20, and a fourth terminal 30 electrically coupled to the second AC drive device 22. In some embodiments, the power conversion device 18 may include more than four terminals.

[0025] When the electric drive system 10 is operated in an electric driven mode, in some embodiments, the first terminal 24 may be configured to receive a first input power from the first energy storage unit 12, and the second terminal 26 may be configured to receive a second input power from the second energy storage unit 14. In some embodiments, the power conversion device 18 is configured to perform power conversion with respect to the received first input

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
35 of 584

power and second input power, provide a first output power at the third terminal 28, and provide a second output power at the fourth terminal 30. The first output power may be provided to the first AC drive device 20, and the second output power may be provided to the second AC drive device 22.

[0026] When the electric drive system 10 is operated in a regenerative or braking mode, in some embodiments, the third terminal 28 may be configured to receive a first input power from the first AC drive device 20, and the fourth terminal 30 may be configured to receive a second input power from the second AC drive device 22. In some embodiments, the power conversion device 18 is configured to perform power conversion with respect to the received first input power and the second input power, provide first output power at the first terminal 24 for charging the ESS 11 (e.g., first energy storage unit 12), and provide second output power at the second terminal 26 for charging the ESS 11 (e.g., second energy storage unit 14).

[0027] The power conversion system 13 may include a pre-charging switching device 16 electrically coupled between the first energy storage unit 12 and the second energy storage unit 14 for selectively providing a power flow path between the first energy storage unit 12 and the second energy storage unit 14. In some embodiments, the power flow path may be unidirectional, so that the first energy storage unit 12 may deliver electric power through the unidirectional power flow path for charging the second energy storage unit 14. In some embodiments, the power flow path may be bi-directional, so that the electric power can be delivered between the first energy storage unit 12 and the second energy storage unit 14 through the bi-directional power flow path.

[0028] A load system 31 may include a first load 27 coupled to the first AC drive device 20 and a second load 29 coupled to the second AC drive device 22. In some embodiments, the first load 27 and the second load 29 may receive a first mechanical torque from the first AC drive device 20 and a second mechanical torque from the second AC drive device 22 respectively. In some embodiments, when the electric drive system 10 is operated in the regenerative or braking mode, the first load 27 and the second load 29 may provide a first mechanical torque and a second mechanical torque to the first AC drive device 20 and the second AC drive device 22 respectively. Then the first and second mechanical torques may be converted by the first and second AC drive devices 20, 22, respectively, into electric power for charging the ESS 11.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
36 of 584

[0029] With a combination of at least two energy storage units, at least one power providing or receiving action may be taken in an appropriate manner to improve the power utilization and extend the life of ESS. With a combination of at least two AC drive devices, at least one power conversion action may be taken in a flexible manner to improve the efficiency of the electric drive system.

[0030] FIG. 2 illustrates a block diagram of an electric drive system 50 applied in a propulsion system (not shown) for driving a single load 23 in accordance with an exemplary embodiment of the present disclosure. The propulsion system may include an EV system and an elevator system. The electric drive system 50 is similar to the electric drive system 10 shown in FIG. 1 and includes the ESS 11, the power conversion system 13, the AC traction system 15, and the EMS 17. Thus, detail description about the ESS 11, the power conversion system 13, the AC traction system 15, and the EMS 17 are omitted herein. In some embodiments, the electric drive system 50 includes a power split device 19 mechanically coupled between the AC traction system 15 and the load 23.

[0031] The power split device 19 includes a first mechanical terminal 32, a second mechanical terminal 34, and a third mechanical terminal 36. The first mechanical terminal 32 is mechanically coupled to the first AC drive device 20 for receiving or providing a first mechanical torque. The second mechanical terminal 34 is mechanically coupled to the second AC drive device 22 for receiving or providing a second mechanical torque. The third mechanical terminal 36 is mechanically coupled to the load 23 for providing or receiving a third mechanical torque. In some embodiments, the power split device 19 includes one or more gears 35 for transmitting mechanical torques provided by the AC traction system 15 to the load 23.

[0032] In some embodiments, when the propulsion system is driving a heavy load, the first mechanical terminal 32 receives a first mechanical torque from the first AC drive device 20, the second mechanical terminal 34 receives a second mechanical torque from the second AC drive device 22, and the third mechanical terminal 36 provides a third mechanical torque to the load 23. The third mechanical torque is a combination of the first mechanical torque and the second mechanical torque by the power split device 19.

[0033] In some embodiments, when the propulsion system is operated in a regenerative or braking mode, the third mechanical terminal 36 receives a third mechanical torque from the load

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
37 of 584

23, the first mechanical terminal 32 provides a first mechanical torque to the first AC drive device 20, and the second mechanical terminal 34 provides a second mechanical torque to the second AC drive device 22. The first mechanical torque and the second mechanical torque are split from the third mechanical torque by the power split device 19. Then the first mechanical torque and the second mechanical torque may be converted into electric power by the AC traction system 15 for charging the ESS 11.

[0034] In some embodiments, when the propulsion system is driving a light load, the first mechanical terminal 32 receives a first mechanical torque from the first AC drive device 20, the second mechanical terminal 34 provides a second mechanical torque to the second AC drive device 22, and the third mechanical terminal 36 provides a third mechanical torque to the load 23. The second mechanical torque and the third mechanical torque are split from the first mechanical torque by the power split device 19. Then the second mechanical torque may be converted into electric power by the second AC drive device 22 for charging the ESS 11.

[0035] In some embodiments, the electric drive system 50 may include an optional transmission device 21. The transmission device 21 may be mechanically coupled between the AC traction system 15 and the power split device 19 for matching the output speed of the AC traction system 15 with the electric drive system speed.

[0036] In some embodiments, the transmission device 21 may be mechanically coupled between the first AC drive device 20 and the first mechanical terminal 32 of the power split device 19. In some embodiments, the transmission device 21 may be mechanically coupled between the second AC drive device 22 and the second mechanical terminal 34 of the power split device 19. In some embodiments, the transmission device 21 may be eliminated when the output speed of the AC traction system 15 meets requirements of the propulsion system.

[0037] The weight, size, and cost of the electric drive system may be decreased by selecting appropriate energy storage units, appropriate AC drive devices, and an appropriate combination of the energy storage units and the AC drive devices.

[0038] In some embodiments, the ESS 11 may include a battery and another battery used as the first energy storage unit 12 and the second energy storage unit 14, respectively. In some embodiments, the ESS 11 may include a battery and an ultra-capacitor used as the first energy

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
38 of 584

storage unit 12 and the second energy storage unit 14, respectively. In some embodiments, the ESS 11 may include other kinds of energy source such as a flywheel battery.

[0039] In some embodiments, the AC traction system 15 may include an induction motor (IM) and another IM used as the first AC drive device 20 and the second AC drive device 22, respectively. In some embodiments, the AC traction system 15 may include an IM and an interior permanent motor (IPM) used as the first AC drive device 20 and the second AC drive device 22, respectively. In some embodiments, the AC traction system 15 may include other kinds of AC motor.

[0040] FIG. 3 illustrates a diagram of an electric drive system 100 applied in an EV system (not shown) in accordance with an exemplary embodiment of the present disclosure. The electric drive system 100 includes an ESS 102, a power conversion system 104, an AC traction system 106, an EMS 108, a power split device 122, and a transmission device 119.

[0041] In some embodiments, the ESS 102 includes a battery 101 and an ultra-capacitor 103. The AC traction system 106 includes a first AC drive device 116 and a second AC drive device 118. The first AC drive device 116 includes a first DC/AC inverter 111 and an IM 115. The second AC drive device 118 includes a second DC/AC inverter 113 and an IPM 117. In some embodiments, a single power conversion device 107 is used which has been described in detail in the power conversion device 18 shown in FIG. 1.

[0042] Several power flow paths may be formed in the electric drive system 100. In some embodiments, the battery 101 may be enabled to deliver electric power through the power conversion system 104, which in turn provides converted electric power to at least one of the IM 115 and the IPM 117, thereby at least a first power flow path is formed. In some embodiments, the ultra-capacitor 103 may be enabled to deliver electric power through the power conversion system 104, which in turn provides converted electric power to at least one of the IM 115 and the IPM 117, thereby at least a second power flow path is formed.

[0043] In some embodiments, the mechanical torques of at least one of the IM 115 and the IPM 117 firstly are converted into electric power and then the electric power may be delivered through the power conversion system 104 for charging at least one of the battery 101 and the ultra-capacitor 103, thereby at least a third power flow path is formed. In some embodiments,

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
39 of 584

the battery 101 may deliver electric power through the pre-charging switching device 105 for charging the ultra-capacitor 103, thereby at least a fourth power path is formed.

[0044] A flexible charging strategy can be implemented to charge at least one of the battery 101 and the ultra-capacitor 103. For example, in some embodiments, the ultra-capacitor 103 can be charged with electric power generated from the IM 115 and converted by the single power conversion device 107. This is different from the prior charging strategy that charging the ultra-capacitor 103 through the use of pre-charging switching device 105. In some embodiments, the EMS 108 may be configured to implement a decoupling algorithm for controlling the IM 115 and the IPM 117 separately.

[0045] FIG. 4 illustrates a diagram of an electric drive system 200 with a first power conversion device 207 and a second power conversion device 209 coupled in parallel applied in an EV system (not shown) in accordance with an exemplary embodiment of the present disclosure. In some embodiments, the power split device 121 may include one or more planetary sets 37 for transmitting mechanical torques provided by the AC traction system 106 to the load 123.

[0046] In some embodiments, the first power conversion device 207 includes a first terminal 231 and a third terminal 235. The second power conversion device 209 includes a second terminal 233 and a fourth terminal 237.

[0047] In some embodiments, electric power from IM 115 may be delivered to the ultra-capacitor 103 through the power conversion system 204 indirectly via the pre-charging switching device 105, and electric power from the IPM 117 may be delivered to the ultra-capacitor 103 through the power conversion system 204.

[0048] A decoupling control of the two AC motors 115, 117 may be managed by controlling the first power conversion device 207 and the second power conversion device 209 separately due to different output DC voltages at the third terminal 235 and the fourth terminal 237.

[0049] Several charging paths may be implemented for charging the ultra-capacitor 103. In some embodiments, the battery 101 may deliver electric power through the pre-charging switching device 105 for charging the ultra-capacitor 103. In some embodiments, the IM 115 may deliver electric power through the first power conversion device 207 and the pre-charging

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
40 of 584

switching device 105 for charging the ultra-capacitor 103. In some embodiments, the IPM 117 may deliver electric power through the second power conversion device 209 for charging the ultra-capacitor 103. In some embodiments, at least a part of the mechanical torque provided from the IM 115 can be converted into electric power through the IPM 117 and the second power conversion device 209, so that the ultra-capacitor 103 can be charged.

[0050] FIG. 5 illustrates a diagram of an electric drive system 300 with a first power conversion device 307 and a second power conversion device 309 coupled in series applied in an EV system (not shown) in accordance with an exemplary embodiment of the present disclosure.

[0051] The first power conversion device 307 includes a first terminal 331, a second terminal 333, and a third terminal 335. In some embodiments, the third terminal 335 is electrically coupled to the second AC drive device 118 and the second power conversion device 309. The second power conversion device 309 includes an input terminal 337 electrically coupled to the third terminal 335 of the first power conversion device 307, and an output terminal 339 electrically coupled to the first AC drive device 116. In some embodiments, the power flow paths may also be implemented in a flexible manner similar to what has been described with reference to FIG. 3.

[0052] A decoupling control of the IM 115 and the IPM 117 may be achieved by controlling the first power conversion device 307 and the second power conversion device 309 separately due to different output DC voltages at the third terminal 335 and the output terminal 339.

[0053] In some embodiments, the second power conversion device 309 is coupled to the second AC drive device 118. In some embodiments, the power conversion system 304 may include more separate power conversion devices and a flexible manner in connecting these separate power conversion devices.

[0054] FIG. 6 illustrates a flowchart of an energy management method 600 for controlling power flow in an electric drive system in accordance with an exemplary embodiment. At least some blocks of the method 600 may be programmed with software instructions stored in a computer-readable storage medium which, when executed by a processor, perform various steps of the method 600. The computer-readable storage medium may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology. The computer-readable storage medium includes, but is not limited to, RAM, ROM, EEPROM, flash memory

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
41 of 584

or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other non-transitory medium which may be used to store the desired information and which may be accessed by an instruction execution system.

[0055] In some embodiments, the method 600 may start at block 601, when a measured electric drive system speed V_{speed} is received. Then the process goes to block 603, in some embodiments, a required power P_{req} is calculated by a total torque request signal T_{total} and V_{speed}. Then the process goes to block 605.

[0056] At block 605, a determination is made to enable at least one of the first AC drive device 20 and the second AC drive device 22 based at least in part on V_{speed}. In some embodiments, the propulsion system may be operated in a normal mode based at least in part on V_{speed}. The normal mode may include a starting mode, an accelerating or uphill mode, a cruising mode, and a regenerative or braking mode. In some embodiments, the propulsion system may be operated in a fault-tolerate mode according to measured current signals or voltage signals.

[0057] In some embodiments, the operating AC drive device and an operating manner (e.g., motor, generator) of the AC motor in the AC drive device are determined based at least in part on the operating mode and P_{req}. If both of the first AC drive device 20 and the second AC drive device 22 are enabled, the process goes to 607, if not, the process goes to 609.

[0058] At block 607, several optimization algorithms may be implemented in a torque distribution unit for distributing the total torque request signal T_{total} into a first torque command signal and a second torque command signal. The first torque command signal is provided to the first AC drive device 20 and the second torque command signal is provided to the second AC drive device 22. Then the process goes to block 609.

[0059] At block 609, a determination is made to enable at least one of the first energy storage unit 12 and the second energy storage unit 14 based at least in part on the operating AC drive device and the structure of the power conversion system. In some embodiments, the operating manner (e.g., charger, discharger) of the first and second energy storage units is determined.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
42 of 584

[0060] In some embodiments, a principle for determining the operating energy storage unit is that the first energy storage unit 12 is operated as a primary power supplier, the second energy storage unit 14 is operated as an assistant. In some embodiments, the first energy storage unit 12 provides power to the first AC drive device 20 and the second energy storage unit 14 provides power to the second AC drive device 22.

[0061] In some embodiments, the second energy storage unit 14 provides an additional power when P_{req} rapidly that the first energy storage unit 12 alone may fail to provide the required power P_{req} due to a limitation of its charge/discharge characteristic. In some embodiments, when the second energy storage unit 14 fails to provide the additional power, the first energy storage unit 12 can be relied on to provide the needed power.

[0062] In some embodiments, the power provided by the first AC drive device 20 and the second AC drive device 22 may be partly used to charge the second energy storage unit 14 when the propulsion system is operated in a regenerative or braking mode. Then the process goes to block 611.

[0063] At block 611, power control signals 171 based at least in part on the enabled AC drive device and the enabled energy storage unit is determined for controlling power converting process. The power control signals 171 may be obtained by the description below.

[0064] The electric power may be generated from the ESS 11 and provided to the AC traction system 15. In some embodiments, a first input power received by the first terminal 24 may be converted into a first output power at the third terminal 28 and a second output power at the fourth terminal 30.

[0065] In some embodiments, a second input power received by the second terminal 26 may be converted into another first output power at the third terminal 28 and another second output power at the fourth terminal 30.

[0066] In some embodiments, a first input power received by the first terminal 24 and a second input power received by the second terminal 26 are converted into another first output power at the third terminal 28 and another second power at the fourth terminal 30.

[0067] Then electric power received by the third terminal 28 and the fourth terminal 30 are selectively provided to the AC traction system 15 based on the operating AC drive device.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
43 of 584

[0068] The electric power may be generated from the AC traction system 15 and be used to charge the ESS 11. In some embodiments, when the first AC motor in the first AC drive device 20 is operated as a generator, the electric power generated from the first AC drive device 20 may be used to charge the ESS 11. The electric power can be delivered to the second energy storage unit 14 through the power conversion device 18 directly or through the pre-charging device 16 via the power conversion device 18 indirectly.

[0069] In some embodiments, when the second AC motor in the second AC drive device 22 is operated as a generator, the electric power generated from the second AC drive device 22 may be delivered to the ESS 11 through the power conversion device 18 directly.

[0070] In some embodiments, when the first AC motor in the first AC drive device 20 is enabled as a motor and the second AC motor in the second AC drive device 22 is enabled as a generator, the mechanical torque from the first AC drive device 20 may be split by the power split device 19 into a first mechanical torque and a second mechanical torque. The first mechanical torque is supplied to the load 23, and the second mechanical torque is converted to an electric power for charging the second storage unit 14 through the power conversion device 18.

[0071] In some embodiments, the power generated from the first energy storage unit 12 may be delivered to the second energy storage unit 14 through the pre-charging switching device 16. Then the process goes to block 613. At block 613, the power control signals 171 is used to control the power flow among the energy storage system 11, the power conversion system 13 and the AC traction system 15. Then the process goes to block 615, torque control signals 173 are provided to the AC traction system 15 for outputting desired torques for driving the load 23.

[0072] The process described above may be modified in a variety of ways. In some embodiment, an additional block may be included before block 601, at the additional block, a determination is made to ascertain whether a pre-charging process should be enabled according to a current, a voltage or a power P_{esu2} of the second storage unit 14. In some embodiments, when $P_{esu2} < P_2$ (where P_2 is a predetermined value which represents a threshold that the second energy storage unit needs to be charged), the pre-charging process is enabled. Otherwise, the pre-charging process is disabled.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
44 of 584

[0073] In some embodiments, the pre-charging process function is initiated before the propulsion system is enabled. The pre-charging process includes charging the second energy storage unit 14 from the first energy storage unit 12 through the pre-charging switching device 16 which may ensure that the second energy storage unit 14 can provide enough power quickly when needed. Then the process goes to block 601.

[0074] FIG. 7 illustrates a flowchart of determining whether both of the first AC drive derive and the second AC drive device are enabled shown in FIG. 6 in an EV system in accordance with an exemplary embodiment of the present disclosure. The detailed illustration is based on the structure shown in FIG. 3. However, a person having ordinary skills in the art may apply the method disclosed herein to other propulsion systems.

[0075] In some embodiments, the flowchart 700 may start at block 701, if the EV system fails, at least one of the measured current signals or the voltage signals exceeds predetermined value, the EV system is operated in a fault-tolerate mode as shown at block 705. Otherwise, the EV system is operated in a normal mode as shown at block 703.

[0076] When the EV system is operated in the fault-tolerate mode, at least one of the battery 101, ultra-capacitor 103, IM 115, and IPM 117 fails. The normal parts may be reconfigured as a simplified electric drive system.

[0077] In some embodiments, one of the battery 101 and ultra-capacitor 103 with both of the IM 115 and IPM 117 are reconfigured. In some embodiments, both of the battery 101 and ultra-capacitor 103 with one of the IM 115 and IPM 117 are reconfigured. In some embodiments, one of the battery 101 and ultra-capacitor 103 with one of the IM 115 and IPM 117 are reconfigured. Therefore, the EV system may be allowed to stop in a safe way in the fault-tolerate mode with a fault-tolerant capability and reliability.

[0078] When the EV system is operated in the normal mode, after receiving a vehicle speed V_{speed} 707 and calculating P_{req} with V_{speed} and T_{total} 709, the process goes to four branches 702, 704, 706, and 708. The four branches will determine the operating AC motor and the operating manner. Index {1} is used to indicate that the IM 115 is enabled, index {2} is used to indicate that the IPM 117 is enabled, and index {1, 2} is used to indicate that both of the IM 115 and IPM 117 are enabled.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
45 of 584

[0079] At branch 702, the EV system is operated in a starting mode 711 when V_{speed} increases from about 0. In the starting mode, a determination is made to ascertain whether the IPM 117 can meet P_{req} 719, if yes, the process goes to block 723, in which the IPM 117 is enabled as a motor for providing necessary mechanical torque to meet P_{req}. If not the process goes to block 725, in which the IM 115 is enabled as a motor is enabled as a motor for providing necessary mechanical torque to meet P_{req}.

[0080] At branch 704, the EV system is operated in an accelerating or uphill mode 713 when V_{speed} changes with a sudden increase over a period of time. In the accelerating or uphill mode, the process goes to block 727, in which the IM 115 and IPM 117 are enabled as a motors for providing necessary mechanical torques to meet P_{req}.

[0081] At branch 706, the EV system is operated in a cruising mode 715 when V_{speed} fluctuates within a scope of a small range. In the cruising mode, the process goes to block 729, in which at least one of the IM 115 and IPM 117 is enabled as a motor for providing necessary mechanical torque to meet P_{req}.

[0082] At branch 708, the EV system is operated in a regenerative or braking mode 717 when V_{speed} changes with a sudden decrease over a period of time. In the regenerative or braking mode, the process goes to block 731, in which both of the IM 115 and IPM 117 are enabled as generators.

[0083] FIG. 8 illustrates a flowchart of calculating two torque control signals through a torque distribution unit shown in FIG. 6 in an EV system in accordance with an exemplary embodiment of the present disclosure. At block 801, at least one signal such as T_{total} is received. At block 803, a first AC motor torque signal referred to as "$M_{torque1}$" and a second AC motor torque signal referred to as "$M_{torque2}$" are received. At block 805, a first AC motor speed signal referred to as "M_{speed1}" and a second AC motor speed signal referred to as "M_{speed2}" are received.

[0084] At block 807, a first torque command signal referred to herein as "$T_{torque1}$" and a second torque command signal referred to herein as "$T_{torque2}$" are calculated through a torque distribution unit. The torque distribution unit may be embodied as software which may be

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
46 of 584

implemented by the EMS 17 described above. In some embodiments, T_{total} may be provided by either the first AC motor (e.g., IM 115) or the second AC motor (e.g., IPM 117) or both the first and second AC motors with an appropriate torque distribution algorithm.

[0085] In some embodiments, $T_{torque1}$ and $T_{torque2}$ may be calculated through a fixed proportion algorithm which is based at least in part on torque providing capability of the first and second AC motors as shown in FIG. 9. Waveforms 901 and 905 show the torque providing capability of the first and second AC motors (e.g., IM 115 and IPM 117). In an embodiment, one of the first and second AC motors can meet the requirement of T_{total}, if not, the other AC motor will work to provide an additional torque according to the following equations:

$$a\,T_{torque1} = T_{total}\ (0 \le a \le 1) \quad (1),$$

$$b\,T_{torque2} = T_{total}\ (0 \le b \le 1) \quad (2),$$

$$a + b = 1 \quad (3).$$

[0086] Where a and b are two variables, in some embodiments, a and b may include a group of fixed values. When $a = 0, b = 1$, the first AC motor 115 itself provides T_{total}, when $a = 1, b = 0$, the second AC motor 117 itself provides T_{total}. In some embodiments, a and b may include several groups of fixed values, so that an optimal torque distribution method can be implemented.

[0087] In some embodiments, T_{total} may be distributed to an average torque referred herein as "$T_{average}$" and a peak torque referred herein as "T_{peak}". $T_{torque1}$ and $T_{torque2}$ are equal to $T_{average}$ and T_{peak} respectively. For example, a peak torque is needed, in particular, with a sudden acceleration. In an embodiment,one of the first and second AC motors can provide the peak torque in a quick and stable response.

[0088] As shown in FIG. 9, the first AC motor can provide a large torque within a narrow speed range and the second AC motor can provide a smaller torque with a quick response within a wide speed range. In some embodiments, the second AC motor is used as an assistant which can work on and off. Basically, the algorithm is according to the following equations:

$$T_{total} = T_{average} + T_{peak} \quad (4),$$

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
47 of 584

$$T_{torque1} = T_{average} \quad (5),$$

$$T_{torque2} = T_{peak} \quad (6).$$

[0089] In some embodiments, $T_{torque1}$ and $T_{torque2}$ may be calculated through an algorithm of maximizing the system efficiency according to the high efficiency areas 903, 907 of the first and second AC motors shown in FIG. 9. In an embodiment,both the first and second AC motors can work in their own high efficiency areas by using the second AC motor to assist the first AC motor. In some embodiments, the transmission device 21 is used to change the operating point which can be implemented by changing M_{speed1} (e.g., waveforms 913, 915).

[0090] In some embodiments, when M_{speed1} and M_{speed2} are fixed values, the operating points of the first and second AC motors may move along with waveforms 909, 911 within the scope of the high efficiency areas 903, 907. Thereby the total loss can be minimized. The algorithm may be determined according to the following equations:

$$T_{torque1} + T_{torque2} = T_{total} \quad (7),$$

$$P_{loss1} + P_{loss2} = min \quad (8).$$

[0091] Where P_{loss1} and P_{loss2} are power loss of the first and second AC motors respectively. This method functions through checking a look up table defining high efficiency areas of the two AC motors according to efficiency maps of each AC motor in the first AC drive device 20 and the second AC drive device 22 for reducing the total loss based at least in part on the motor speeds M_{speed1} and M_{speed2}.

[0092] FIG. 10 illustrates a flowchart of enabling at least one of the first energy storage unit and the second energy storage unit is enabled shown in FIG. 6 in accordance with an exemplary embodiment of the present disclosure. P_{req} is used to represent a required power, P_{bat} is used to represent a power provided by the battery 101, P_{uc} is used to represent a power provided by the ultra-capacitor 103, $P_{bat(threshold)}$ is used to represent an upper limit power provided by the battery 101, $P_{uc(threshold)}$ is used to represent an upper limit power provided by the ultra-capacitor 103, and $P_{uc(charging)}$ is used to represent a required charging power of the ultra-capacitor 103.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
48 of 584

[0093] At block 1001, P_{req} and motor index are received. Then process goes to block 1003, a determination is made to ascertain which branch the process will go. The process goes to block 1005 when receiving index {1} or index {1, 2}. Otherwise, the process goes to block 1007 when receiving index {2}.

[0094] At block 1005, if P_{req} is larger than P_{bat}, the process goes to block 1009. Otherwise, the process goes to block 1011 in which the battery 101 provides the power. At block 1009, if $P_{uc(threshold)}$ is larger than an additional power $P_{req} - P_{bat(threshold)}$, the process goes to block 1013 that the battery 101 provides the upper limit power itself and the ultra-capacitor 103 provides the additional power.

[0095] At block 1007, if P_{req} is larger than $P_{uc(threshold)}$, the process goes to block 1017. Otherwise, the process goes to block 1019 that the ultra-capacitor 103 provides the power. At block 1017, if the ultra-capacitor 103 requires to be charged, the process goes to 1021 that the ultra-capacitor 103 receives the required charging power $P_{uc(charging)}$, and the battery 101 provides both the required power P_{req} and the required charging power of the ultra-capacitor 103 $P_{uc(charging)}$. Otherwise, the process goes to block 1023 that the ultra-capacitor 103 provides the upper limit power itself and the battery provides the additional power.

[0096] As will be understood by those familiar with the art, the present invention may be embodied in other specific forms without depending from the spirit or essential characteristics thereof. Accordingly, the disclosures and descriptions herein are intended to be illustrative, but not limiting, of the scope of the invention which is set forth in the following claims.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
49 of 584

CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable the first electric motor to operate as a motor to drive the vehicle in a first mode of operation when the vehicle is cruising; and

enable the first electric motor and second electric motor to operate as motors to drive the vehicle in a second mode of operation when the vehicle is accelerating.

2. The drive system of claim 1, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

3. The drive system of claim 2, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

4. The drive system of claim 1, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
50 of 584

5. The drive system of claim 1, further comprising a pre-charging switching device.

6. The drive system of claim 1, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

7. An electric drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first inverter coupled to the power conversion device;

a first AC motor coupled to the first inverter;

a second inverter coupled to the power conversion device;

a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor;

a power split device coupled to the transmission device and the second AC motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to selectively:

enable the first AC motor to operate as a motor to drive the vehicle when the vehicle is cruising; and

enable the first AC motor and second AC motor to operate as motors to drive the vehicle when the vehicle is accelerating.

8. The electric drive system of claim 7, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

9. The drive system of claim 8, wherein the first energy storage unit comprises a

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
51 of 584

battery and the second energy storage unit comprises an ultra-capacitor.

10. The electric drive system of claim 7, further comprising a pre-charging switching device.

11. The electric drive system of claim 7, wherein the EMS is further configured to enable the second AC motor to operate as a generator when the vehicle is cruising.

12. A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable the first electric motor to operate as a motor to drive the vehicle in a first mode of operation when the vehicle is cruising; and

enable the first electric motor and second electric motor to operate as motors to drive the vehicle in a third mode of operation when the vehicle is in an uphill mode.

13. The drive system of claim 12, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
52 of 584

14. The drive system of claim 13, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

15. The drive system of claim 12, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

16. The drive system of claim 12, further comprising a pre-charging switching device.

17. The drive system of claim 12, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
53 of 584

ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

ABSTRACT

An electric drive system includes an energy storage system (ESS), a power conversion system, and an alternating current (AC) traction system. The ESS provides or receives electric power. The ESS includes a first energy storage unit and a second energy storage unit. The power conversion system is electrically coupled to the ESS for converting an input power to an output power. The AC traction system is electrically coupled to the power conversion system for converting the output power of the power conversion system to mechanical torques. The AC traction system includes a first AC drive device and a second AC drive device. An energy management system (EMS) is in electrical communication with the ESS, the AC traction system, and the power conversion system for providing control signals.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
54 of 584

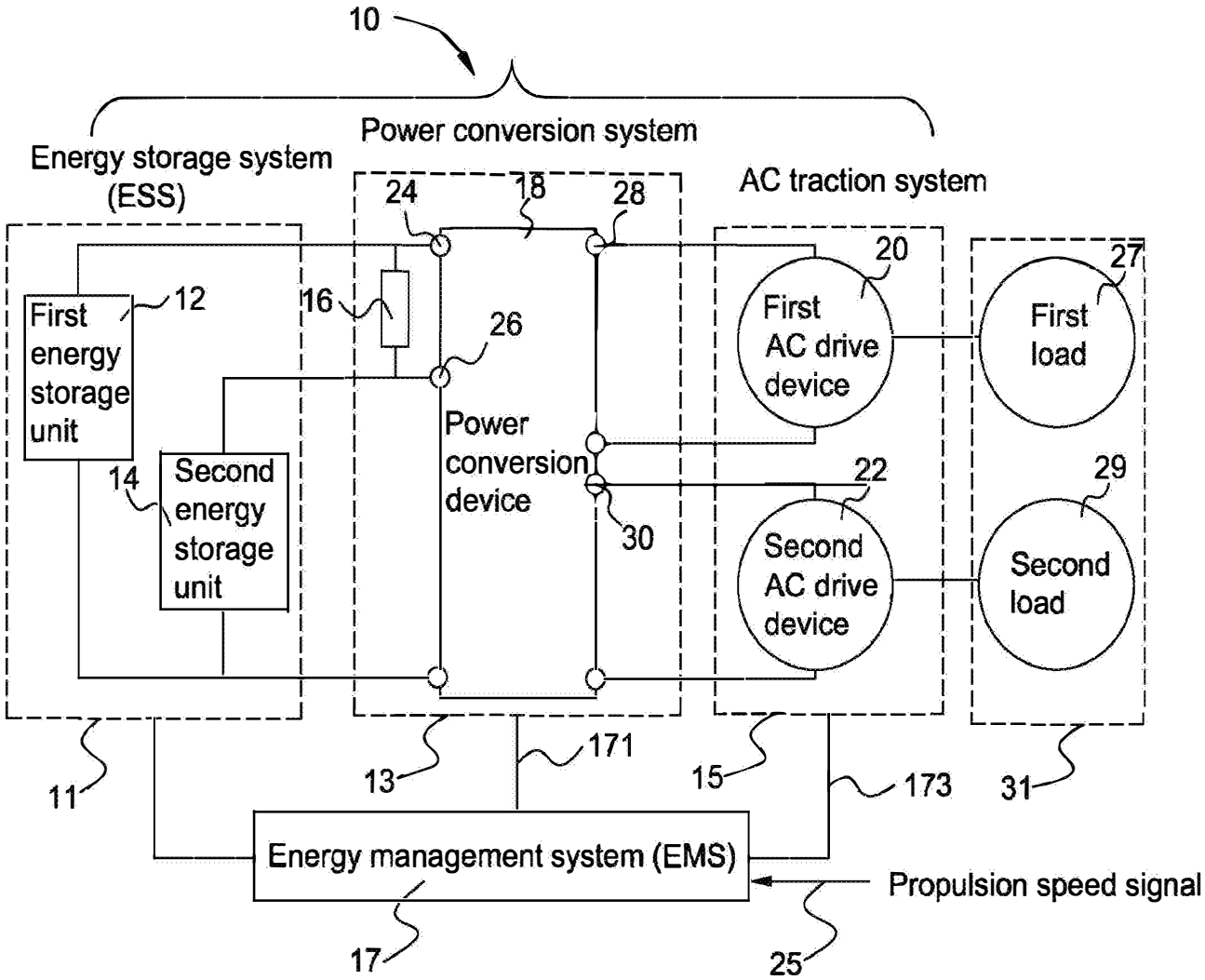

10
Power conversion system
Energy storage system (ESS)
AC traction system
24
18
28
20
27
First energy storage unit
12
16
26
First AC drive device
First load
Power conversion device
14
Second energy storage unit
22
29
30
Second AC drive device
Second load
11
13
171
15
173
31
Energy management system (EMS)
Propulsion speed signal
17
25

FIG. 1

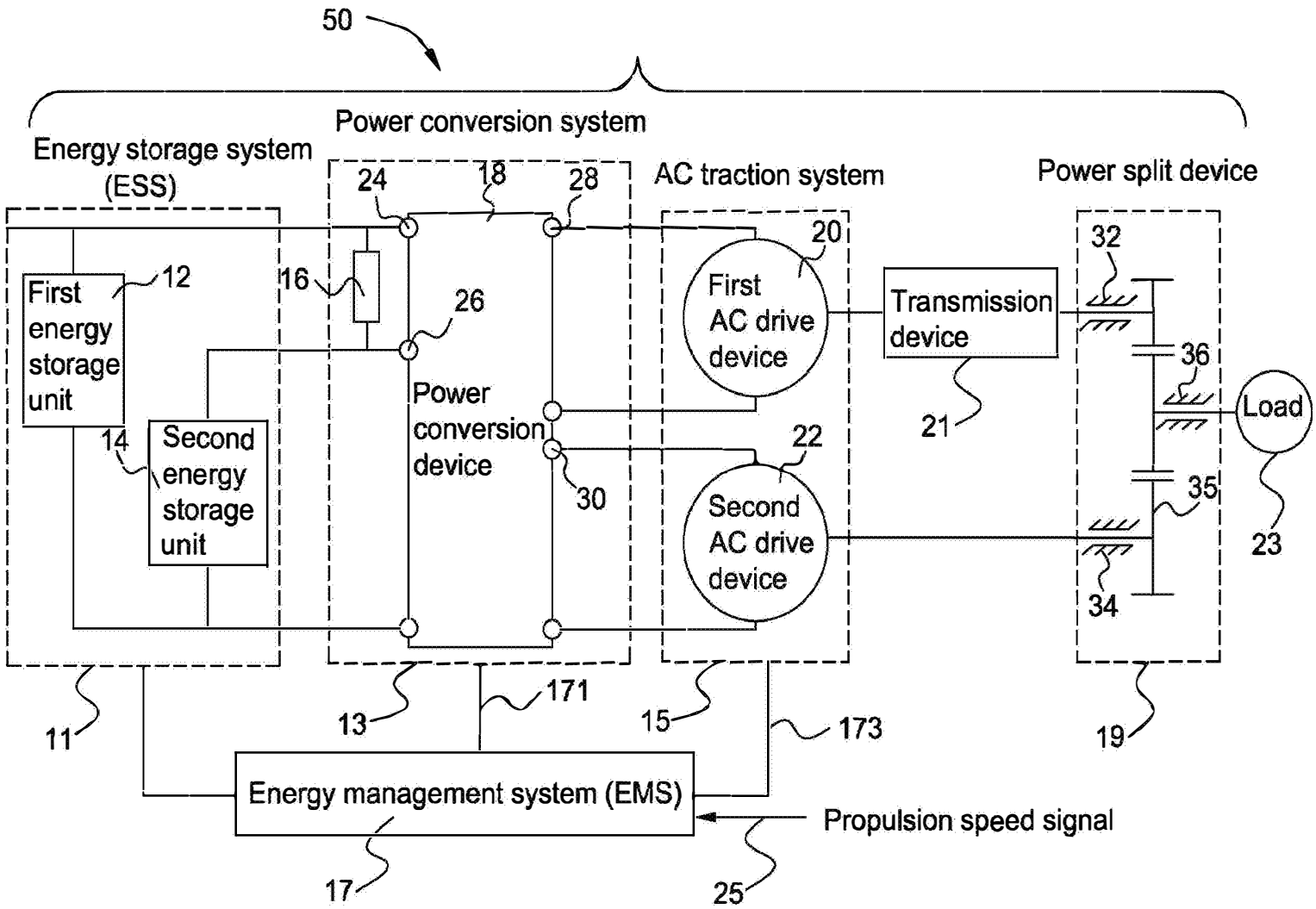

50
Power conversion system
Energy storage system (ESS)
AC traction system
Power split device
First energy storage unit
12
Second energy storage unit
14
16
24
18
28
26
Power conversion device
30
First AC drive device
20
Second AC drive device
22
Transmission device
21
32
36
35
34
Load
23
11
13
171
15
173
19
Energy management system (EMS)
17
Propulsion speed signal
25

FIG. 2

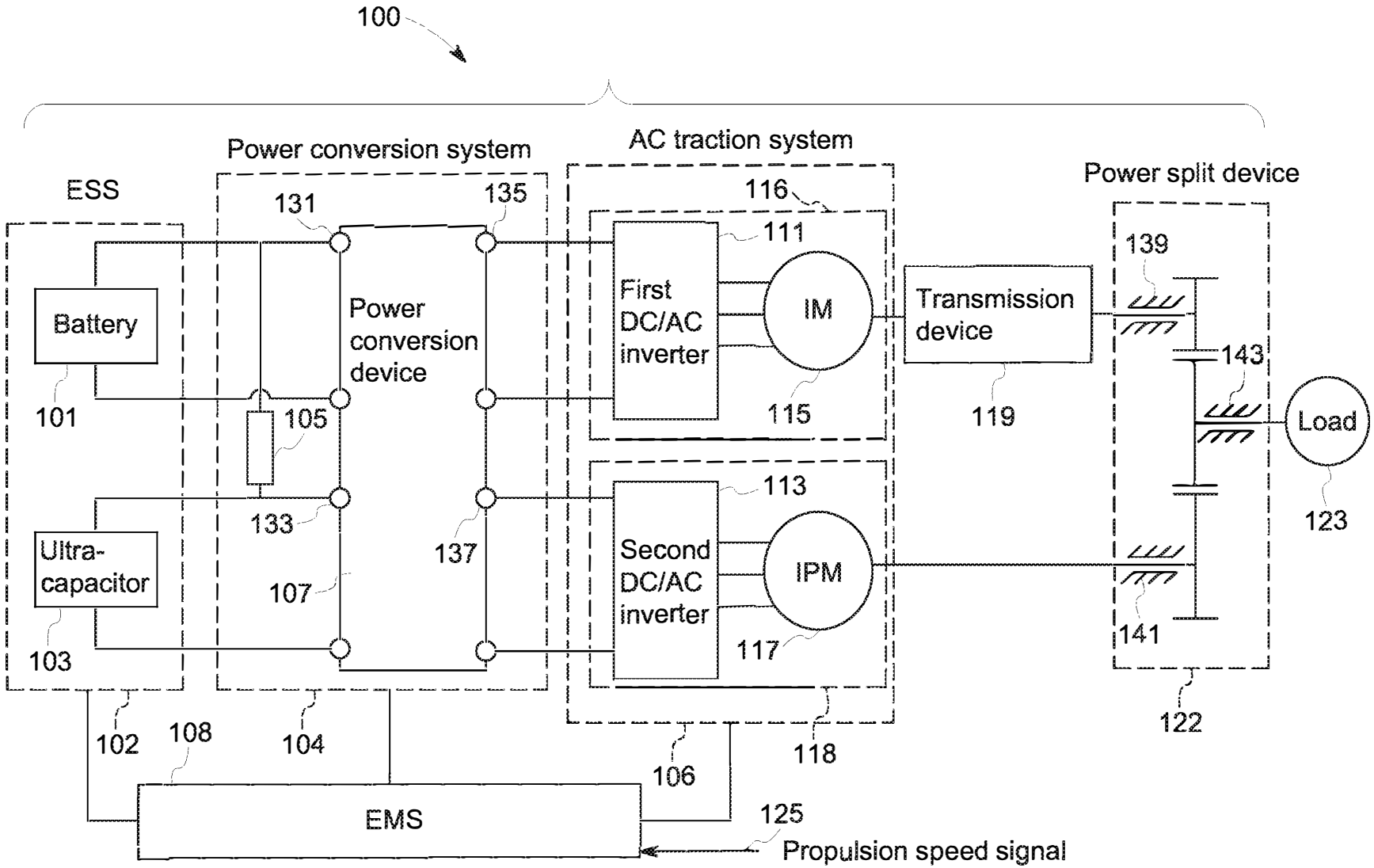

100
Power conversion system
AC traction system
Power split device
ESS
131
135
116
111
139
Battery
Power conversion device
First DC/AC inverter
IM
Transmission device
143
101
105
115
119
Load
113
133
137
Ultra-capacitor
Second DC/AC inverter
IPM
123
107
103
117
141
122
102
108
104
106
118
EMS
125
Propulsion speed signal

FIG. 3

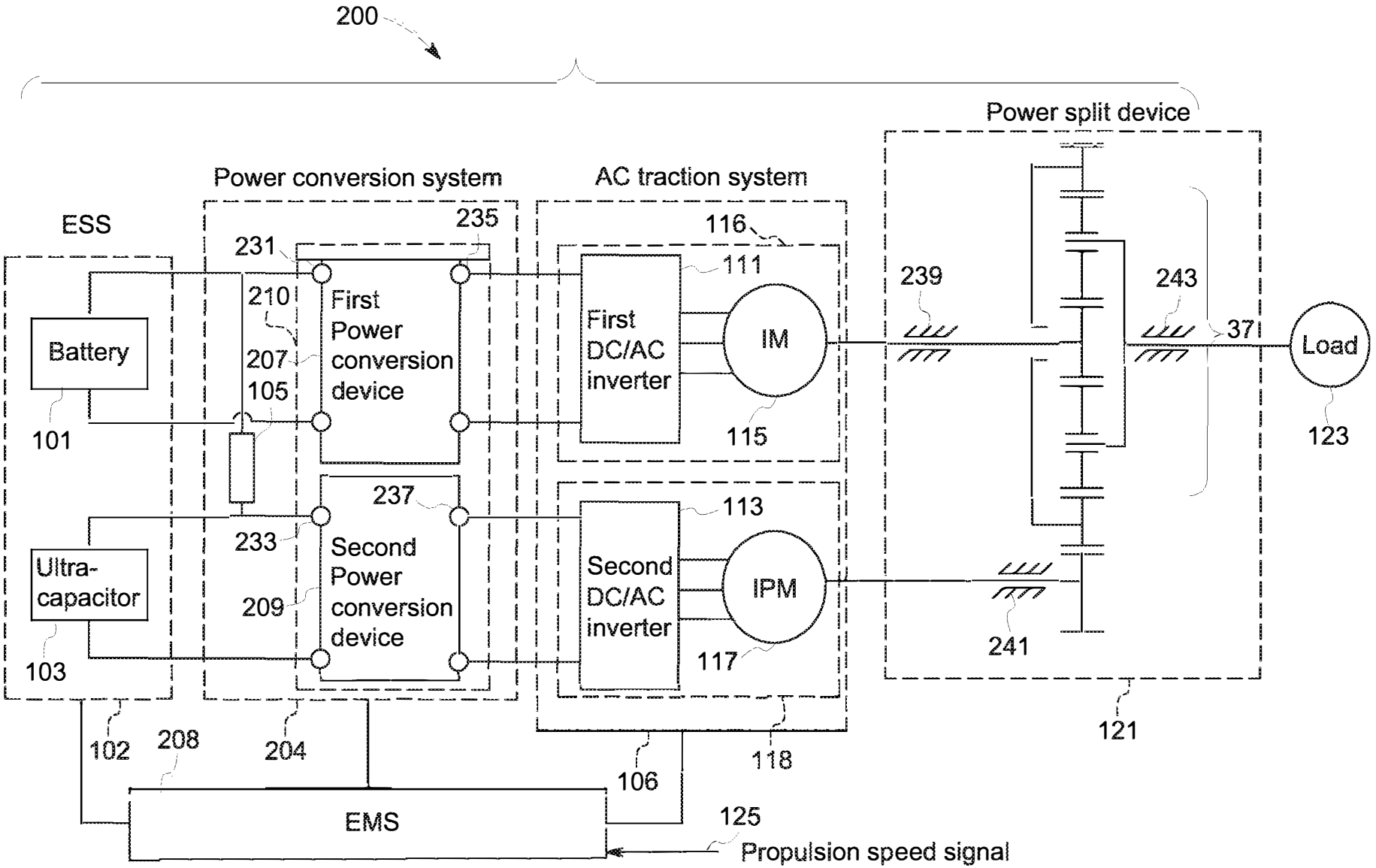

200
Power split device
Power conversion system
AC traction system
ESS
235
116
231
111
239
243
210
First
Power
conversion
device
First
DC/AC
inverter
IM
37
Load
Battery
207
105
101
115
123
410
237
113
233
Second
Power
conversion
device
Second
DC/AC
inverter
IPM
Ultra-
capacitor
209
241
103
117
121
102
208
204
118
106
EMS
125
Propulsion speed signal

FIG. 4

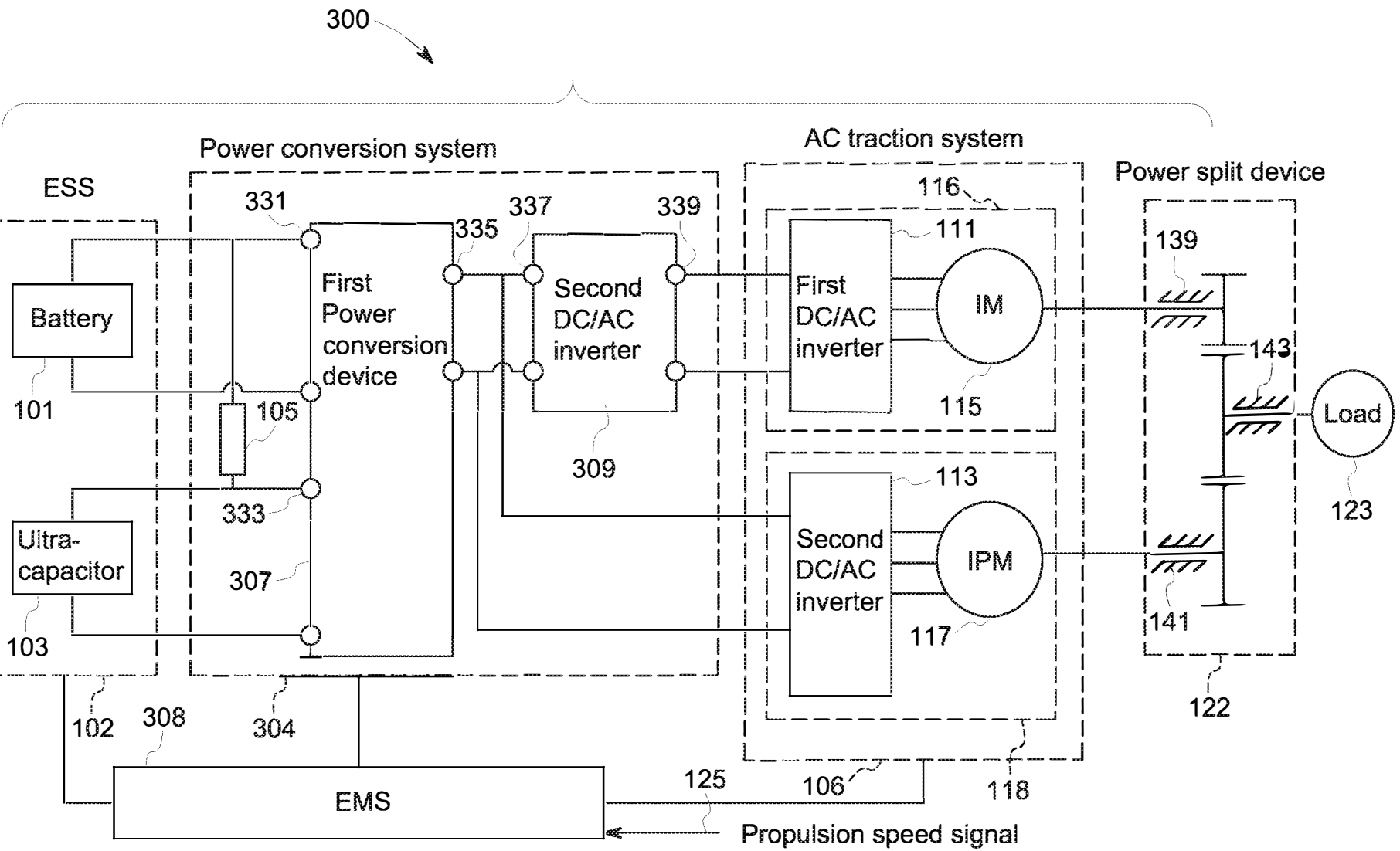

300
Power conversion system
AC traction system
Power split device
ESS
331
337
339
335
116
111
139
First
Power
conversion
device
Second
DC/AC
inverter
First
DC/AC
inverter
IM
Battery
101
105
309
115
143
Load
123
113
Ultra-
capacitor
333
Second
DC/AC
inverter
IPM
307
117
141
103
122
102
308
304
106
118
125
EMS
Propulsion speed signal

FIG. 5

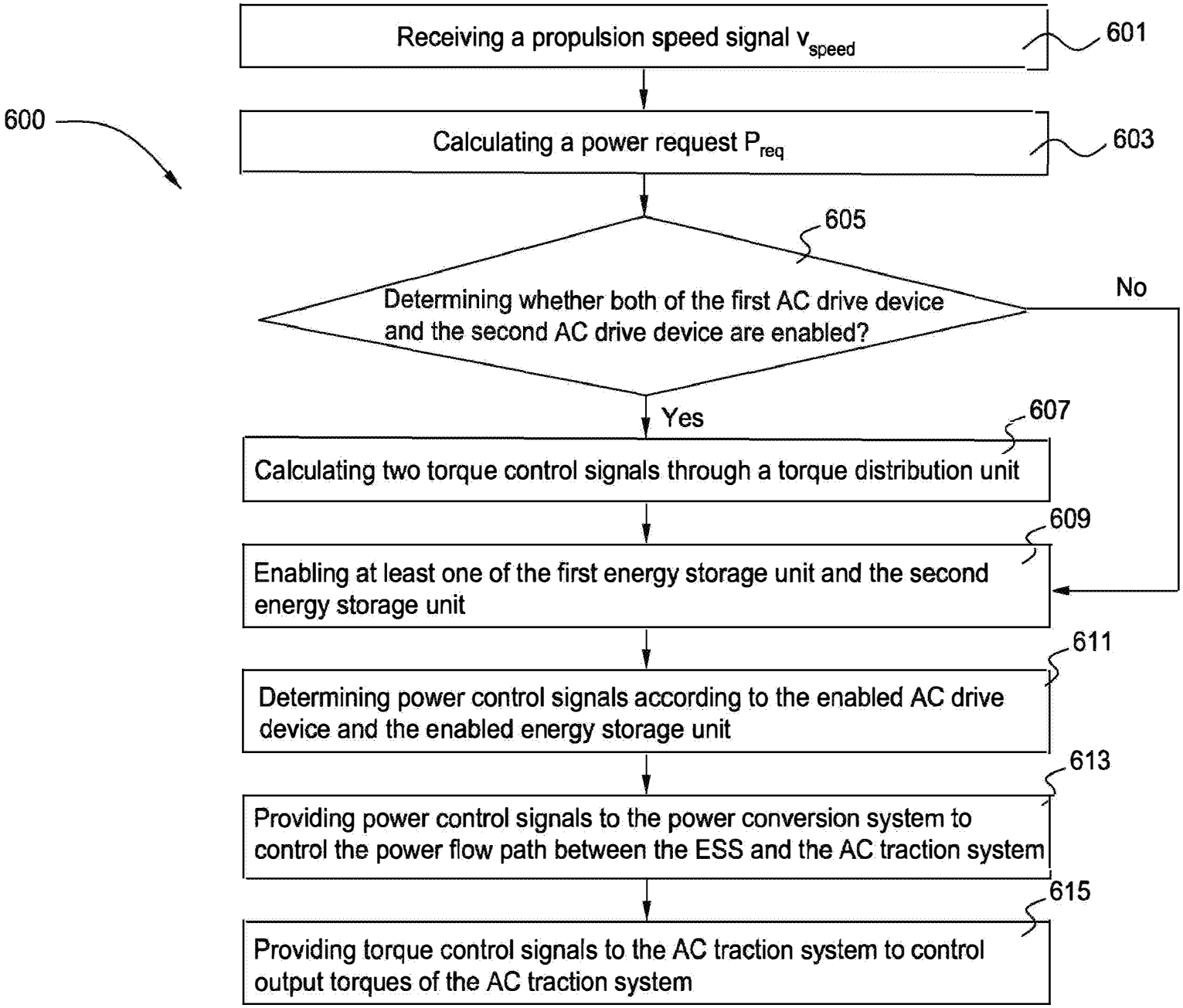

600
Receiving a propulsion speed signal v_{speed}
601
Calculating a power request P_{req}
603
605
Determining whether both of the first AC drive device and the second AC drive device are enabled?
No
Yes
607
Calculating two torque control signals through a torque distribution unit
609
Enabling at least one of the first energy storage unit and the second energy storage unit
611
Determining power control signals according to the enabled AC drive device and the enabled energy storage unit
613
Providing power control signals to the power conversion system to control the power flow path between the ESS and the AC traction system
615
Providing torque control signals to the AC traction system to control output torques of the AC traction system

FIG. 6

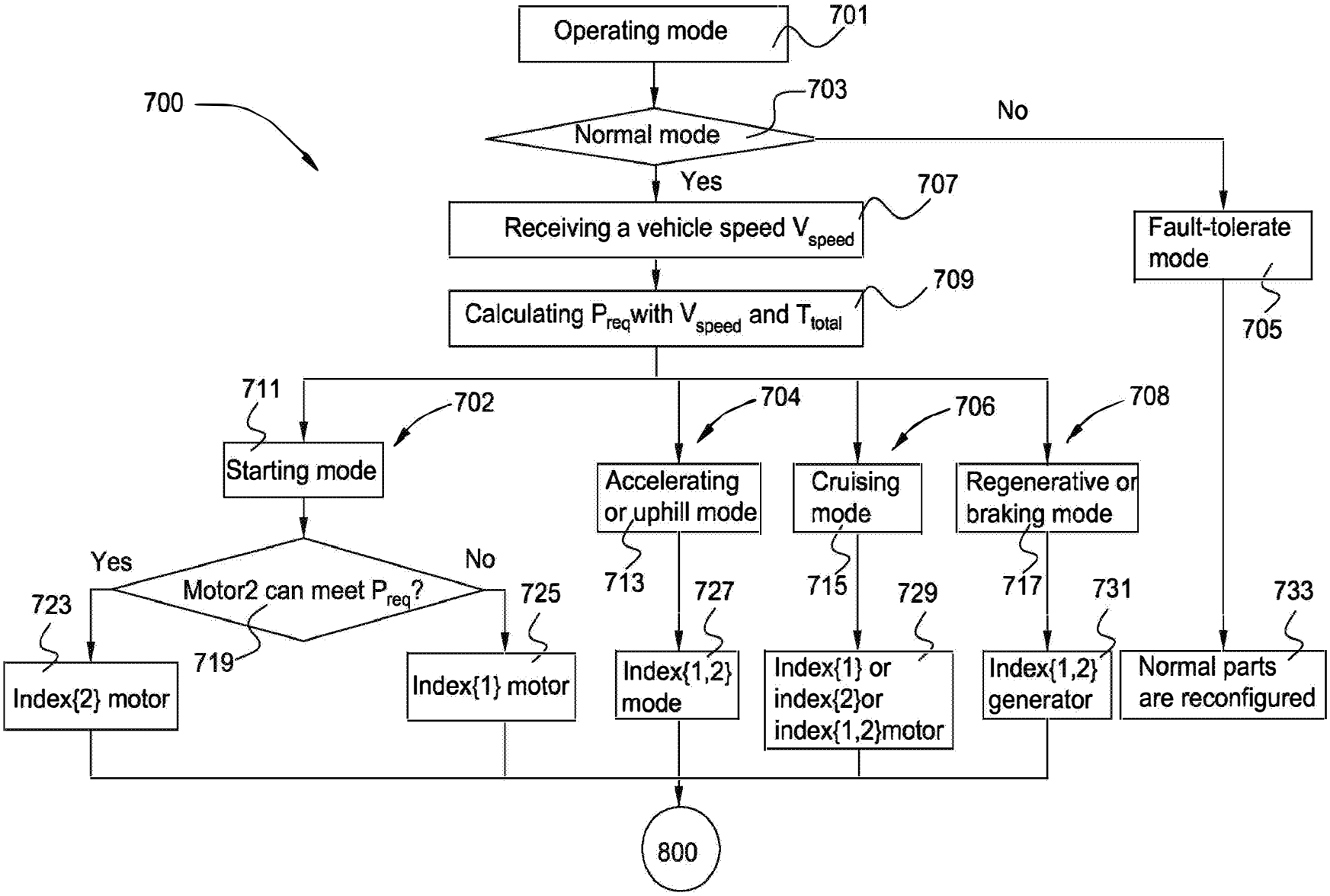

700
Operating mode
701
Normal mode
703
No
Yes
Receiving a vehicle speed V_{speed}
707
Fault-tolerate mode
705
Calculating P_{req} with V_{speed} and T_{total}
709
711
702
704
706
708
Starting mode
Accelerating or uphill mode
Cruising mode
Regenerative or braking mode
Yes
No
Motor2 can meet P_{req}?
719
723
725
713
727
715
729
717
731
733
Index{2} motor
Index{1} motor
Index{1,2} mode
Index{1} or index{2}or index{1,2}motor
Index{1,2} generator
Normal parts are reconfigured
800

FIG. 7

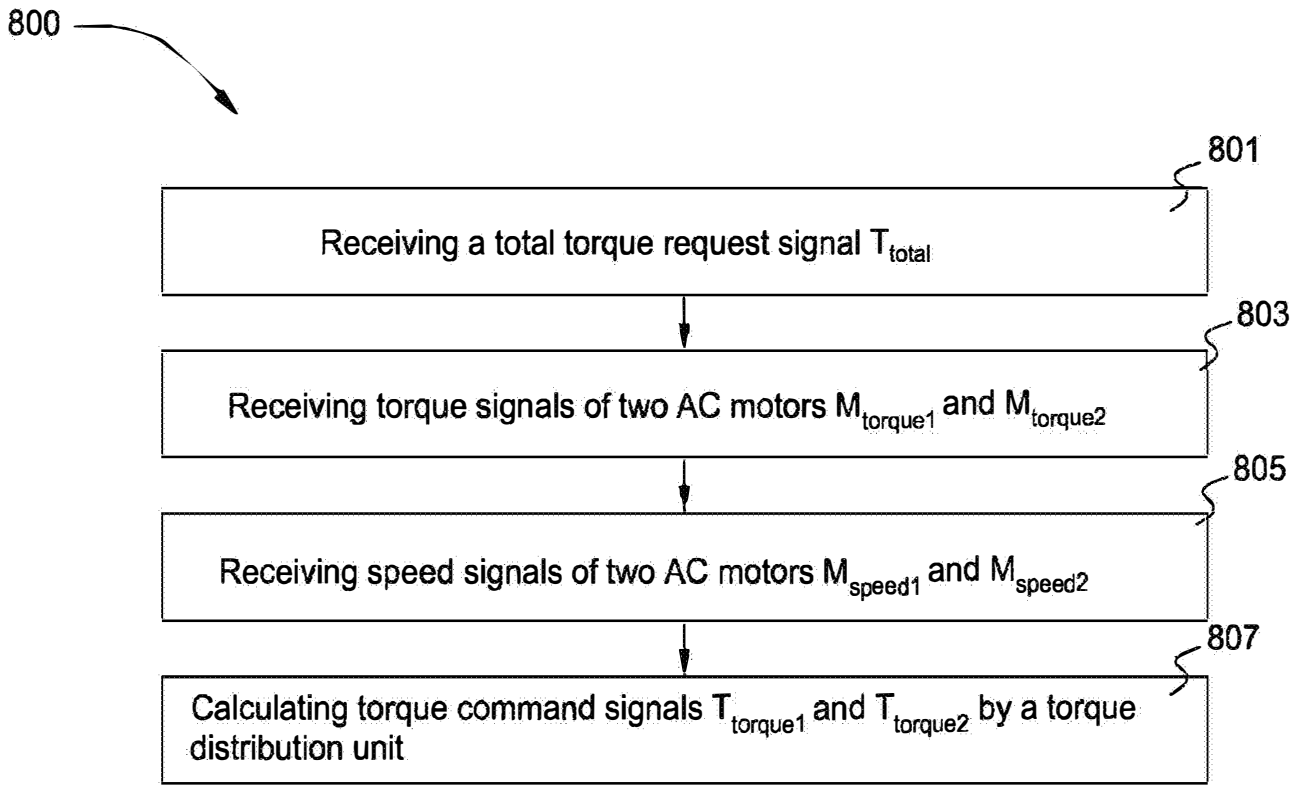

800
801
Receiving a total torque request signal T_{total}
803
Receiving torque signals of two AC motors $M_{torque1}$ and $M_{torque2}$
805
Receiving speed signals of two AC motors M_{speed1} and M_{speed2}
807
Calculating torque command signals $T_{torque1}$ and $T_{torque2}$ by a torque distribution unit

FIG. 8

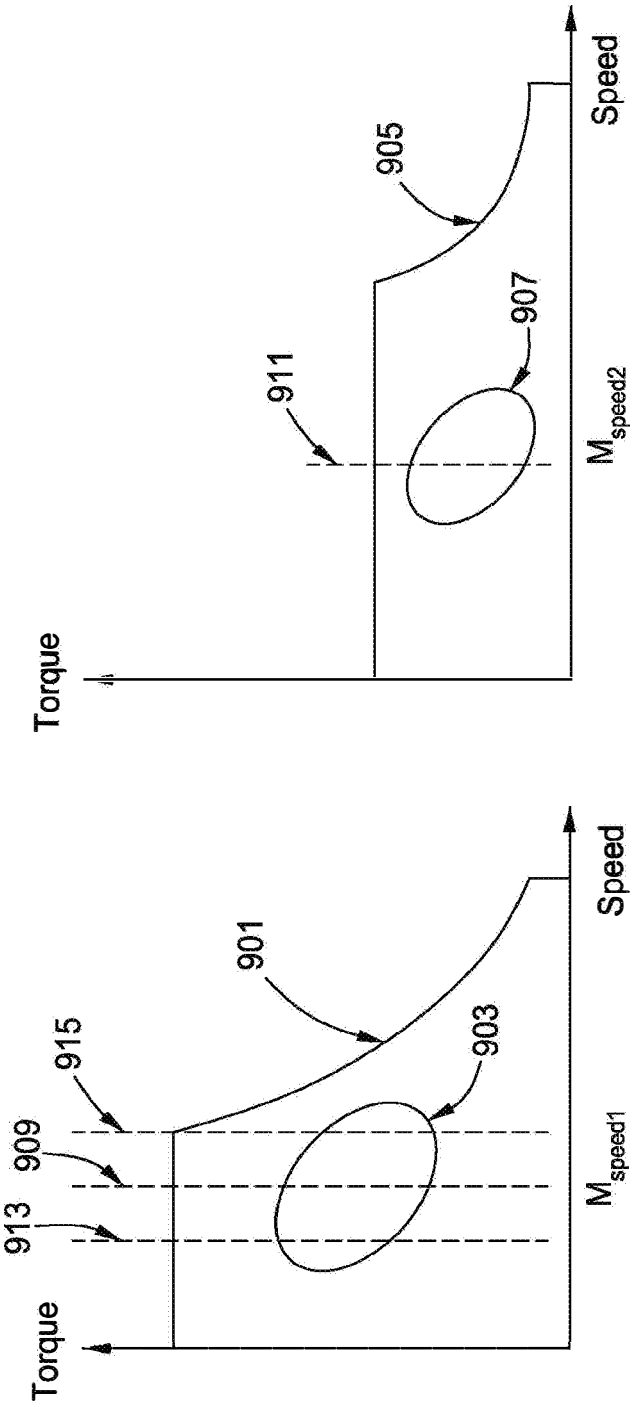

Speed
905
907
911
M_{speed2}
Torque
Speed
901
903
915
909
913
M_{speed1}
Torque

FIG. 9

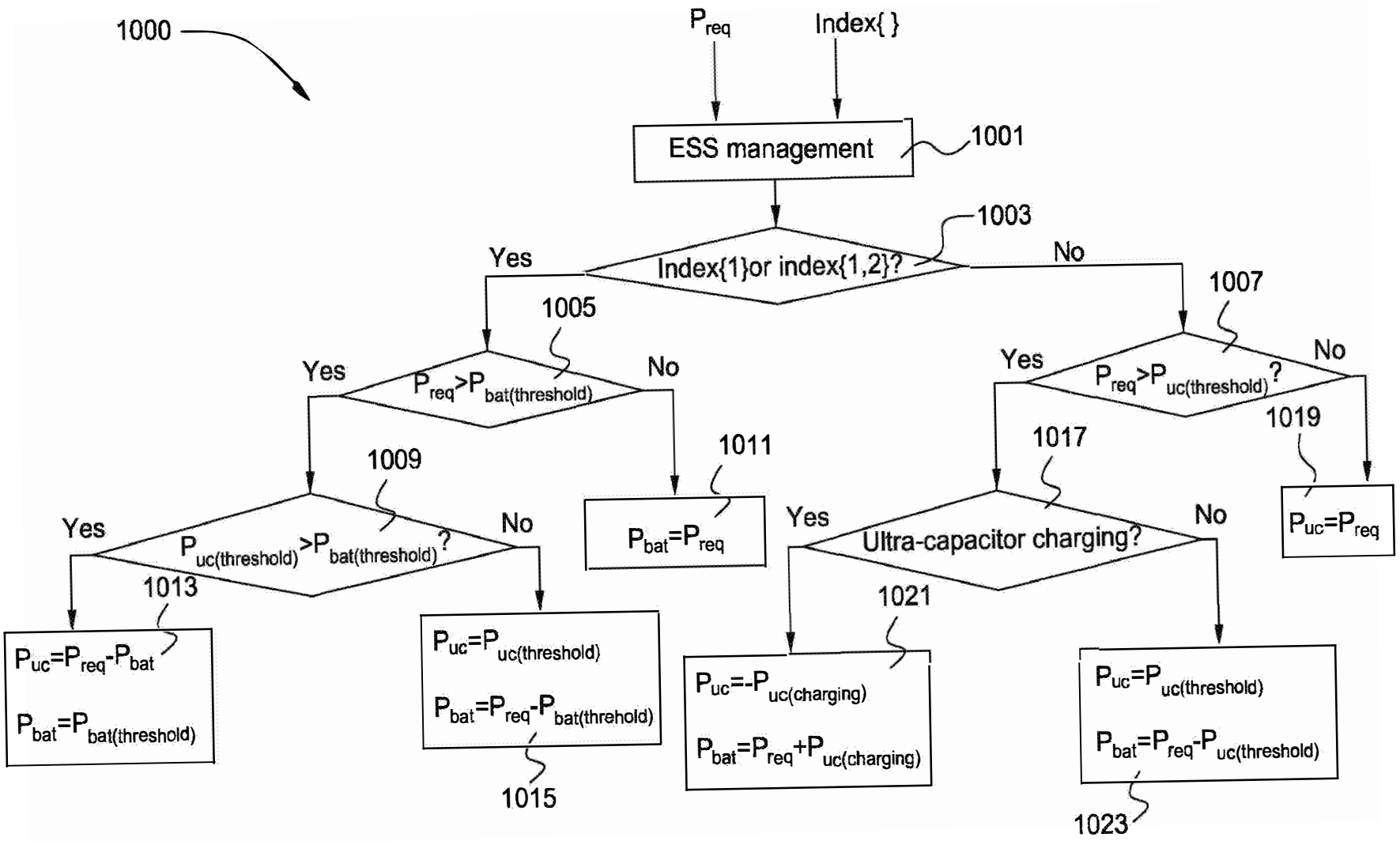

1000
P_{req}
Index{ }
ESS management
1001
1003
Index{1}or index{1,2}?
Yes
No
1005
$P_{req}>P_{bat(threshold)}$
Yes
No
1007
$P_{req}>P_{uc(threshold)}$?
Yes
No
1009
$P_{uc(threshold)}>P_{bat(threshold)}$?
Yes
No
1011
$P_{bat}=P_{req}$
1017
Ultra-capacitor charging?
Yes
No
1019
$P_{uc}=P_{req}$
1013
$P_{uc}=P_{req}-P_{bat}$
$P_{bat}=P_{bat(threshold)}$
$P_{uc}=P_{uc(threshold)}$
$P_{bat}=P_{req}-P_{bat(threhold)}$
1015
1021
$P_{uc}=-P_{uc(charging)}$
$P_{bat}=P_{req}+P_{uc(charging)}$
$P_{uc}=P_{uc(threshold)}$
$P_{bat}=P_{req}-P_{uc(threshold)}$
1023

FIG. 10

GE Docket No. 256975

COMBINED DECLARATION AND GLOBAL ASSIGNMENT

FOR UTILITY OR DESIGN PATENT APPLICATION

As the below named inventor(s), I/we hereby declare that:

This declaration and assignment are directed to:

ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

☐ the specification of which is attached hereto OR

☒ United States application or PCT international application number 14/094086 filed on December 2, 2013, as amended on [date] (if applicable).

(We hereby authorize and request the Company or its delegated attorneys or agents to insert above the application number and filing date of the application when known.)

The above-identified application was made or authorized to be made by us.

We believe that we are original joint inventors of a claimed invention in the application.

We hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC § 1001 by fine or imprisonment of not more than five (5) years, or both.

We have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the patentability of this application as defined in 37 CFR § 1.56, including, for continuation-in-part applications, material information which became available between the filing date of the prior application and the filing date of the continuation-in-part application.

In accordance with our obligation(s) under an Employee Innovation and Proprietary Information Agreement or (as applicable) arising out of other agreements (such as, but not limited to, the Services Agreement between General Electric Company, a New York corporation, and our employers), and/or for other good and valuable consideration of which we acknowledge receipt, I/we,

Inventor First Name	Inventor Middle Name	Inventor Last Name		Residence Town	Residence State	Residence Country
Jian		Zhou	of	Shanghai		CN
Fei		Xu	of	Shanghai		CN
Dong		Liu	of	Shanghai		CN
Hai		Qiu	of	Shanghai		CN
Pengju		Kang	of	Yorktown Heights	NY	USA

GE Docket No. 256975

hereby sell and assign to:

Name of Company: *General Electric Company*
Entity Type (optional): *New York corporation*
Address: *1 River Road, Schenectady, New York 12345 USA*

herein referred to as "Company", its successors and assigns our entire respective rights, titles and interests in and to the invention and improvements made or conceived by us described in the application(s) listed above and in the following table:

Country of Filing	Type of Filing	Application Number	Filing Date	Title
CN	Invention	201210509493.2	December 03, 2012	Electric drive system and energy management method

(We hereby authorize and request the Company or its delegated attorneys or agents to insert above the application number and filing date of the application(s) when known.)

and any and all applications for patent and patents therefrom in any and all countries, including all divisions, continuations, continuations-in-part, reexaminations, renewals, and reissues thereof, and all rights of priority resulting from the filing of the application(s), and authorize and request any official whose duty it is to issue patents, to issue any patent on the inventions and improvements resulting therefrom to the Company, or its successors or assigns, and agree that on request and without further consideration, we will communicate to the Company or its representatives or nominees any facts known to us respecting the inventions and improvements and testify in any legal proceeding, make all rightful oaths, sign all lawful papers and execute all instruments or documents required or requested for the making and prosecution of any applications of any type for patent, utility model, or other similar rights in all countries including, but not limited to, any provisional, non-provisional, continuation, continuation-in-part, divisional, renewal or substitute thereof, for any derivation proceedings relating thereto, and, as to any patents that issue from such applications, for any supplemental examination, derivation proceeding, opposition, post grant review, reissue, re-examination, inter partes review, or extension thereof, and generally do everything possible to aid the Company, its successors, assigns, and nominees to obtain and enforce proper patent protection for the invention and its improvements in all countries.

Remuneration claims of the inventor(s)/assignor(s) potentially arising from German Law on Employee Inventions, or any other respective country law, remain unaffected by this assignment.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
66 of 584

GE Docket No. 256975

INVENTOR 1

Signature: _____ Date: 2013.2.22

Jian Zhou

Witnessed by: _____ Date: 2013.2.22

Signature

_____

Printed Name of Witness

Witnessed by: _____ Date: 2013.2.22

Signature

LIU YONGZHI

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Jian Zhou

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Jian Zhou**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____ (Notary Public)

GE Docket No. 256975

INVENTOR 2

Signature: Fei Xu Date: 2013.02.20.

Fei Xu

Witnessed by: Xuegin Wu Date: 2013-02-20

Signature

Xuegin Wu

Printed Name of Witness

Witnessed by: Yong Li Date: 2013-2-20

Signature

Yong Li

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Fei Xu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Fei Xu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____

(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
68 of 584

GE Docket No. 256975

INVENTOR 3

Signature: Dong Liu Date: 2013. DEC. 3rd

Dong Liu

Witnessed by: Yizhuo Zhang Date: 2013. DEC. 3rd

Signature

Yizhuo Zhang

Printed Name of Witness

Witnessed by: He Huang Date: 2013 DEC. 3rd.

Signature

He Huang

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Dong Liu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Dong Liu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____ (Notary Public)

v9.16.12

GE Docket No. 256975

INVENTOR 4

Signature: _____ Date: 2/5/2013

Hai Qiu

Witnessed by: _____ Date: 2/5/2013

Signature

Anbo Wu

Printed Name of Witness

Witnessed by: Wenqiang Yang Date: 2/5/2013

Signature

Wenqiang Yang

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Hai Qiu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Hai Qiu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____

(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
70 of 584

GE Docket No. 256975

INVENTOR 5

Signature: _____ Date: Feb. 17, 2013
Pengju Kang

Witnessed by: _____ Date: 2013. 2. 17
Signature

程诗

Printed Name of Witness

Witnessed by: _____ Date: 2013.2.17
Signature

LIU YONGZHI

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Pengju Kang

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Pengju Kang**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____
(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
71 of 584

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6092028

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
JIAN ZHOU	02/22/2013
FEI XU	02/20/2013
DONG LIU	12/03/2013
HAI QIU	02/05/2013
PENGJU KANG	02/17/2013

RECEIVING PARTY DATA

Name:	GENERAL ELECTRIC COMPANY
Street Address:	1 RIVER ROAD
City:	SCHENECTADY
State/Country:	NEW YORK
Postal Code:	12345

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16866028

CORRESPONDENCE DATA

Fax Number: (609)454-3957

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 6094543500
Email: smannes@meagheremanuel.com
Correspondent Name: MEAGHER EMANUEL LAKS GOLDBERG & LIAO, LLP
Address Line 1: ONE PALMER SQUARE
Address Line 2: SUITE 325
Address Line 4: PRINCETON, NEW JERSEY 08542

ATTORNEY DOCKET NUMBER:	256975-US-11
NAME OF SUBMITTER:	SILVIA MANNES
SIGNATURE:	/Silvia Mannes/
DATE SIGNED:	05/05/2020
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 7
source=256975-US-11-parentAssignment#page1.tif
source=256975-US-11-parentAssignment#page2.tif
source=256975-US-11-parentAssignment#page3.tif
source=256975-US-11-parentAssignment#page4.tif
source=256975-US-11-parentAssignment#page5.tif
source=256975-US-11-parentAssignment#page6.tif
source=256975-US-11-parentAssignment#page7.tif

GE Docket No. 256975

COMBINED DECLARATION AND GLOBAL ASSIGNMENT

FOR UTILITY OR DESIGN PATENT APPLICATION

As the below named inventor(s), I/we hereby declare that:

This declaration and assignment are directed to:

ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

☐ the specification of which is attached hereto OR

☒ United States application or PCT international application number 14/094086 filed on December 2, 2013, as amended on [date] (if applicable).

(We hereby authorize and request the Company or its delegated attorneys or agents to insert above the application number and filing date of the application when known.)

The above-identified application was made or authorized to be made by us.

We believe that we are original joint inventors of a claimed invention in the application.

We hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC § 1001 by fine or imprisonment of not more than five (5) years, or both.

We have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the patentability of this application as defined in 37 CFR § 1.56, including, for continuation-in-part applications, material information which became available between the filing date of the prior application and the filing date of the continuation-in-part application.

In accordance with our obligation(s) under an Employee Innovation and Proprietary Information Agreement or (as applicable) arising out of other agreements (such as, but not limited to, the Services Agreement between General Electric Company, a New York corporation, and our employers), and/or for other good and valuable consideration of which we acknowledge receipt, I/we,

Inventor First Name	Inventor Middle Name	Inventor Last Name		Residence Town	Residence State	Residence Country
Jian		Zhou	of	Shanghai		CN
Fei		Xu	of	Shanghai		CN
Dong		Liu	of	Shanghai		CN
Hai		Qiu	of	Shanghai		CN
Pengju		Kang	of	Yorktown Heights	NY	USA

GE Docket No. 256975

hereby sell and assign to:

Name of Company: *General Electric Company*
Entity Type (optional): *New York corporation*
Address: *1 River Road, Schenectady, New York 12345 USA*

herein referred to as "Company", its successors and assigns our entire respective rights, titles and interests in and to the invention and improvements made or conceived by us described in the application(s) listed above and in the following table:

Country of Filing	Type of Filing	Application Number	Filing Date	Title
CN	Invention	201210509493.2	December 03, 2012	Electric drive system and energy management method

(We hereby authorize and request the Company or its delegated attorneys or agents to insert above the application number and filing date of the application(s) when known.)

and any and all applications for patent and patents therefrom in any and all countries, including all divisions, continuations, continuations-in-part, reexaminations, renewals, and reissues thereof, and all rights of priority resulting from the filing of the application(s), and authorize and request any official whose duty it is to issue patents, to issue any patent on the inventions and improvements resulting therefrom to the Company, or its successors or assigns, and agree that on request and without further consideration, we will communicate to the Company or its representatives or nominees any facts known to us respecting the inventions and improvements and testify in any legal proceeding, make all rightful oaths, sign all lawful papers and execute all instruments or documents required or requested for the making and prosecution of any applications of any type for patent, utility model, or other similar rights in all countries including, but not limited to, any provisional, non-provisional, continuation, continuation-in-part, divisional, renewal or substitute thereof, for any derivation proceedings relating thereto, and, as to any patents that issue from such applications, for any supplemental examination, derivation proceeding, opposition, post grant review, reissue, re-examination, inter partes review, or extension thereof, and generally do everything possible to aid the Company, its successors, assigns, and nominees to obtain and enforce proper patent protection for the invention and its improvements in all countries.

Remuneration claims of the inventor(s)/assignor(s) potentially arising from German Law on Employee Inventions, or any other respective country law, remain unaffected by this assignment.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
75 of 584

GE Docket No. 256975

INVENTOR 1

Signature: _____ Date: 2013.2.22

Jian Zhou

Witnessed by: _____ Date: 2013.2.22

Signature

_____

Printed Name of Witness

Witnessed by: _____ Date: 2013.2.22

Signature

LIU YONGZHI

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Jian Zhou

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Jian Zhou**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____ (Notary Public)

GE Docket No. 256975

INVENTOR 2

Signature: Fei Xu Date: 2013.02.20.

Fei Xu

Witnessed by: Xuegin Wu Date: 2013-02-20

Signature

Xuegin Wu

Printed Name of Witness

Witnessed by: Yong Li Date: 2013-2-20

Signature

Yong Li

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Fei Xu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Fei Xu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____

(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
77 of 584

GE Docket No. 256975

INVENTOR 3

Signature: Dong Liu Date: 2013. DEC. 3rd

Dong Liu

Witnessed by: Yizhuo Zhang Date: 2013. DEC. 3rd

Signature

Yizhuo Zhang

Printed Name of Witness

Witnessed by: He Huang Date: 2013 DEC. 3rd.

Signature

He Huang

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Dong Liu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Dong Liu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____ (Notary Public)

v9.16.12

GE Docket No. 256975

INVENTOR 4

Signature: _____ Date: 2/5/2013
Hai Qiu

Witnessed by: _____ Date: 2/5/2013
Signature

Anbo Wu
Printed Name of Witness

Witnessed by: Wenqiang Yang Date: 2/5/2013
Signature

Wenqiang Yang
Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Hai Qiu

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Hai Qiu**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____
(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
79 of 584

GE Docket No. 256975

INVENTOR 5

Signature: _____ Date: Feb. 17, 2013

Pengju Kang

Witnessed by: _____ Date: 2013. 2. 17

Signature

Printed Name of Witness

Witnessed by: _____ Date: 2013.2.17

Signature

LIU YONGZHI

Printed Name of Witness

SECTION BELOW IS FOR USE ONLY IF SIGNING IN PRESENCE OF A NOTARY

_____ Date: _____

Pengju Kang

STATE OF

ss.

COUNTY OF

This _____ day of _____, 2013 before me personally came the above-named **Pengju Kang**, to me personally known as the individual who executed the foregoing assignment, who acknowledged to me that he/she executed the same of his/her own free will for the purposes therein set forth.

Seal

_____

(Notary Public)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
80 of 584

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/866,028	05/04/2020	2652	1720	256975-US-11	17	3

CONFIRMATION NO. 1053

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

FILING RECEIPT

OC000000011875914

Date Mailed: 05/11/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Jian Zhou, Shanghai, CHINA;
Fei Xu, Shanghai, CHINA;
Dong Liu, Shanghai, CHINA;
Hai Qiu, Shanghai, CHINA;
Pengju Kang, Yorktown Heights, NY;

Applicant(s)

General Electric Company, Schenectady, NY;

Assignment For Published Patent Application

General Electric Company, Schenectady, NY

Power of Attorney: The patent practitioners associated with Customer Number 131278

Domestic Priority data as claimed by applicant

This application is a CON of 16/433,348 06/06/2019
which is a CON of 15/453,218 03/08/2017 PAT 10374529
which is a CON of 14/094,086 12/02/2013 PAT 9800182

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
CHINA 201210509493.2 12/03/2012 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 05/08/2020
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/866,028**
Projected Publication Date: 08/20/2020
Non-Publication Request: No
Early Publication Request: No
Title

Electric Drive System and Energy Management Method

Preliminary Class

379

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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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 U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
84 of 584

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/866,028

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 460 =	0.00
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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** 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 found in the appropriate box in column 1.

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/866,028	05/04/2020	Jian Zhou	256975-US-11

CONFIRMATION NO. 1053

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

PUBLICATION NOTICE

OC000000119368985

Title: Electric Drive System and Energy Management Method

Publication No.US-2020-0266731-A1
Publication Date:08/20/2020

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/866,028	Filing Date 05/04/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	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), (i), 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	01/22/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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.	LDRC
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/EVA V GILLIS/
*** 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.	

This collection of information is required by 37 CFR 1.16. 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 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Jian Zhou et al. **Application No.:** 16/866,028 **Confirmation No.:** 1053 **Filed:** May 4, 2020 **For:** Electric drive system and energy management method **Group:** 2846 **Examiner:** Chan, Kawing	Our File: 256975-US-11 Date: January 22, 2021

PRELIMINARY AMENDMENT - 37 C.F.R. §1.121(k)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Examiner:

Kindly amend the above-captioned patent application as set forth below.

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	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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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	9108501	B2	2015-08-18	Ortmann et al.	

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	1	2002078105	JP	A	2002-03-15	TOYOTA MOTOR CORP	English abstract only	

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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).

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

☒ A certification statement is not submitted herewith.

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2021-01-22
Name/Print	Craig M. FDrachtman	Registration Number	73,016

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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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Espacenet

Bibliographic data: JP2002078105 (A) — 2002-03-15

POWER OUTPUT SYSTEM AND VEHICLE HAVING IT

Inventor(s): KONDO KOICHI; TAGA YUTAKA; KOJIMA MASAHIRO; HATA YUSHI ± (KONDO KOICHI, ; TAGA YUTAKA, ; KOJIMA MASAHIRO, ; HATA YUSHI)

Applicant(s): TOYOTA MOTOR CORP ± (TOYOTA MOTOR CORP)

Classification: - international: ***B60K17/04; B60K17/356; B60K6/20; B60K6/445; B60K6/52; B60L50/16; B60W10/02; B60W10/04; B60W10/06; B60W10/08; B60W10/10; B60W10/12; B60W10/26; B60W20/00; F02D29/00; F02D29/02; F02D29/06; F16H48/10;*** (IPC1-7): B60K17/04; B60K17/356; B60K41/00; B60K41/02; B60K6/02; B60L11/14; F02D29/00; F02D29/02; F02D29/06; F16H48/10

- cooperative: Y02T10/62 (EP)

Application number: JP20000256249 20000825

Priority number(s): JP20000256249 20000825

Also published as: JP4211209 (B2)

Abstract of JP2002078105 (A)

PROBLEM TO BE SOLVED: To make the system stand continuous drive improving the energy efficiency, and obtain proper torque on two drive shafts. SOLUTION: A motor MG1 and MG2 are attached respectively to the sun gear 33 and the ring gear 37 of the planetary gear 31 which carries and inputs the drive power of the engine 22 to divide it in a constant torque ratio. The ring gear shaft 37 is connected to the shaft 50 of the front wheels, and the shaft 60 of the rear wheels is connected to a motor MG3. The motor MG1, MG2, and MG3 are controlled to output the power of the engine 22 in a desired torque ratio to the front shaft 50 and the rear shaft 60 without charging/discharging the secondary battery 70 or to output the power of the engine 22 and the charging/discharging power of the secondary battery 70 in a desired torque ratio to the front shaft 50 and the rear shaft 60. As a result, the energy efficiency of the system is improved and the torque is more appropriately outputted to the two drive shafts.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
93 of 584

Electronic Acknowledgement Receipt

EFS ID:	41718758
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	22-JAN-2021
Filing Date:	04-MAY-2020
Time Stamp:	14:06:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		256975US11_PreliminaryAmendment.pdf	109257 b8c0bf245d947283a7041b02b51ad4246e8 16cd5	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	7	7
	Claims	2	6
	Preliminary Amendment	1	1

Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	256975US11_IDS.pdf	1034572 5d1700fdbe341cf2d6d14a97518ce8fdc561f80c	no	4
Warnings:					
Information:					
3	Foreign Reference	256975US11_JP200278105.pdf	1437782 ba1706b92f6d40b2b00cb3a63683148a4a8dc2d7	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	2581611		

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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.

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REMARKS

Applicants respectfully request entry of this amendment, which amends claims 1, 7, and 12. Support is found in at least Figures 2 and 7 paragraphs [0074]-[0082] of the application as filed. No new matter has been added.

If the Examiner believes that any minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

Should any fees be due, the Commissioner is hereby authorized to charge any fees in connection with this application and to credit any overpayments to Deposit Account No. 50-5522.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,
Jian Zhou et al.

By: /Craig M. Drachtman/
Craig M. Drachtman
Registration No. 73,016

Meagher Emanuel
Laks Goldberg & Liao, LLP
One Palmer Square, Suite 325
Princeton, NJ 08542
609-454-3500

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
96 of 584

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device ~~motors to drive the vehicle~~ in a second mode of operation when the vehicle is accelerating.

2. (Original) The drive system of claim 1, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

3. (Original) The drive system of claim 2, wherein the first energy storage unit

comprises a battery and the second energy storage unit comprises an ultra-capacitor.

4. (Original) The drive system of claim 1, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

5. (Original) The drive system of claim 1, further comprising a pre-charging switching device.

6. (Original) The drive system of claim 1, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

7. (Currently Amended) An electric drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first inverter coupled to the power conversion device;

a first AC motor coupled to the first inverter;

a second inverter coupled to the power conversion device;

a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor;

a power split device coupled to the transmission device and the second AC motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to selectively:

enable the first AC motor to operate as a motor to drive the

vehicle through the transmission device when the vehicle is cruising; and

enable the first AC motor to operate as a motor to drive the vehicle through the transmission device and enable the second AC motor to operate as a motor to drive the vehicle through the power split device ~~motors to drive the vehicle~~ when the vehicle is accelerating.

8. (Original) The electric drive system of claim 7, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

9. (Original) The drive system of claim 8, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

10. (Original) The electric drive system of claim 7, further comprising a pre-charging switching device.

11. (Original) The electric drive system of claim 7, wherein the EMS is further configured to enable the second AC motor to operate as a generator when the vehicle is cruising.

12. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device ~~motors to drive the vehicle~~ in a third mode of operation when the vehicle is in an uphill mode.

13. (Original) The drive system of claim 12, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

14. (Original) The drive system of claim 13, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

15. (Original) The drive system of claim 12, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
100 of 584

16. (Original) The drive system of claim 12, further comprising a pre-charging switching device.

17. (Original) The drive system of claim 12, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
101 of 584

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	1	2007-220976	JP	A	2007-08-30	TOYOTA MOTOR CORP	See English Family Member US20090015185	

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特開2007-220976
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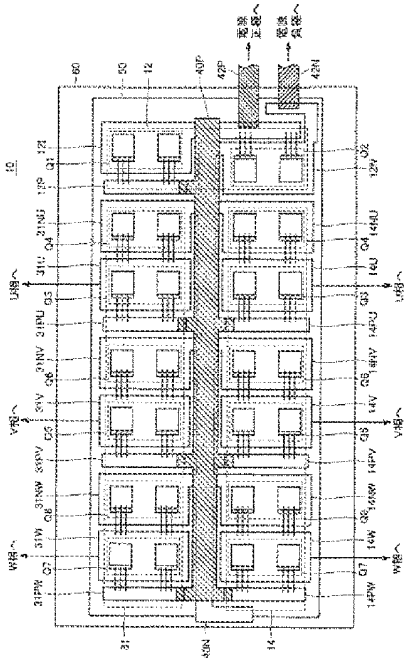
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(54)【発明の名称】半導体モジュールおよびそれを備えるハイブリッド車両の駆動装置

(57)【要約】
【課題】小型化が可能な半導体モジュールおよびそれを備えるハイブリッド車両の駆動装置を提供する。
【解決手段】バスバー４０Ｐは電源ラインを構成し、バスバー４０Ｎはアースラインを構成する。バスバー４０Ｐ，４０Ｎは、絶縁部材を介して絶縁基板５０の法線方向に積層される。このとき、上層側に位置するバスバー４０Ｐは金属部材で構成され、下層側に位置するバスバー４０Ｎは絶縁基板５０上に形成された配線層で構成される。一方のバスバーを配線層として絶縁基板５０に固着させたことで当該バスバーの放熱が確保される。これにより、当該バスバーを比較的断面積の小さい配線層とすることができるため、半導体モジュールを法線方向に小型化できる。半導体モジュールをハイブリッド車両の駆動装置に搭載することにより、車両搭載時の鉛直方向に小型化できるとともに、車両の重心位置を低くして走行安定性を向上することができる。
【選択図】図２



【特許請求の範囲】
【請求項1】
電源の一方極に接続される第１電源線と、
前記電源の他方極に接続される第２電源線と、
前記第１電源線と前記第２電源線との間に接続される第１および第２のスイッチング素子と、
前記第１および第２のスイッチング素子が搭載された絶縁基板とを備え、
前記第１電源線は、前記第１のスイッチング素子の第１電極層に結合されるバスバーからなり、
前記第２電源線は、前記絶縁基板上に配設され、前記第２のスイッチング素子の第２電極層に結合される配線層からなる、半導体モジュール。
【請求項2】
前記絶縁基板上に配設され、前記第１および第２のスイッチング素子の制御電極に制御信号を入力するための信号線層と、
前記第１電源線、前記第１および第２のスイッチング素子および前記第２電源線を導通するための第１導線部材と、
前記第１および第２のスイッチング素子の制御電極と前記信号線層とを導通するための第２導線部材とをさらに備え、
前記信号線層は、前記第１導線部材と前記第２導線部材との延在方向が互いに略垂直となるように配置される、請求項１に記載の半導体モジュール。
【請求項3】
前記第１電極層と前記第２電極層とは、前記スイッチング素子の通過電流が互いに逆方向に流れるように配置される、請求項２に記載の半導体モジュール。
【請求項4】
前記絶縁基板下面に装着された放熱部材をさらに備える、請求項１に記載の半導体モジュール。
【請求項5】
内燃機関のクランクシャフトが結合されるダンパと、
前記ダンパの回転軸とその回転軸が重なるように配置される回転電機と、
前記内燃機関の発生した動力に前記回転電機の発生した動力を合成して駆動軸に伝達する動力伝達機構と、
前記ダンパ、前記回転電機および前記動力伝達機構を収容するケースと、
前記回転電機の制御を行なうパワー制御ユニットとを備え、
前記パワー制御ユニットは、請求項１から請求項４のいずれか１項に記載の半導体モジュールを含み、前記回転軸方向から投影した場合に、前記ケースの前記ダンパ、前記回転電機、および前記動力伝達機構を収容する部分の投影部の車両搭載時の水平方向の寸法に収まるように、前記ケース内に配置される、ハイブリッド車両の駆動装置。
【請求項6】
内燃機関のクランクシャフトが結合されるダンパと、
前記ダンパの回転軸とその回転軸が重なるように配置される回転電機と、
前記内燃機関の発生した動力に前記回転電機の発生した動力を合成して駆動軸に伝達する動力伝達機構と、
前記ダンパ、前記回転電機および前記動力伝達機構を収容するケースと、
前記回転電機の制御を行なうパワー制御ユニットとを備え、
前記パワー制御ユニットは、請求項１から請求項４のいずれか１項に記載の半導体モジュールを含み、前記回転軸方向から投影した場合に、前記ケースの前記ダンパ、前記回転電機、および前記動力伝達機構を収容する部分の投影部の車両搭載時の鉛直方向の寸法に収まるように、前記ケース内に配置される、ハイブリッド車両の駆動装置。
【請求項7】

前記パワー制御ユニットは、
前記回転電機の回転中心軸に対する一方側に配置されるリアクトルと、
前記回転電機の前記回転中心軸に対する他方側に配置されるコンデンサとをさらに含む【発明の詳細な説明】項６に記載のハイブリッド車両の駆動装置。
【技術分野】
【０００１】
この発明は、半導体モジュールおよびそれを備えるハイブリッド車両の駆動装置に関し、より特定的には、インバータやコンバータを構成する半導体モジュールおよびそれを備えるハイブリッド車両の駆動装置に関する。
【背景技術】
【０００２】
最近、環境に配慮した自動車として、ハイブリッド自動車（Hybrid Vehicle）および電気自動車（Electric Vehicle）が注目されている。ハイブリッド自動車は、従来のエンジンに加え、インバータを介して直流電源により駆動されるモータを動力源とする自動車である。つまり、エンジンを駆動することにより動力源を得るとともに、直流電源からの直流電圧をインバータによって交流電圧に変換し、その変換した交流電圧によりモータを回転することによって動力源を得るものである。また、電気自動車は、インバータを介して直流電源によって駆動されるモータを動力源とする自動車である。
【０００３】
このようなハイブリッド自動車または電気自動車に搭載されるインテリジェントパワーモジュール（ＩＰＭ）は、ＩＧＢＴ（Insulated Gate Bipolar Transistor）等の半導体スイッチング素子（パワー半導体素子）を高速スイッチングすることにより、直流電源から供給される直流電力を交流電力に変換してモータを駆動するものである。
【０００４】
たとえば特許文献１は、スイッチング素子を電源あるいは負荷に接続する導体としてのバスバーを備えたスイッチング回路において、異なる複数のバスバーが絶縁体を挟んで締結された状態で基台上に固定されることを特徴とするスイッチング回路を開示する。
【０００５】
これによれば、電源または負荷とスイッチング回路との間で電流を流すのに十分な広い断面積を備えた導体として、金属部材からなるバスバーが適用される。そして、電源正極に接続される電源正極側バスバーと電源負極に接続される電源負極側バスバーとは、基台上に絶縁体を挟んで一体的に締結された状態となるように固定される。
【特許文献1】特開２００３－９５０７号公報
【特許文献2】特開２００５－３３８８２号公報
【特許文献3】特開平１１－２９９０５６号公報
【特許文献4】特開平１１－１８７５４２号公報
【発明の開示】
【発明が解決しようとする課題】
【０００６】
しかしながら、上記のスイッチング回路においては、各々が金属部材からなるバスバーが絶縁体を挟んで基台の法線方向に重なって配置されるため、基台の法線方向に増長させるという問題がある。そのため、ＩＰＭにおいて小型化が強く要求されるところ、法線方向における小型化に限界が生じていた。
【０００７】
また、上記のスイッチング回路は、スイッチング素子と電源側バスバーとの間、およびスイッチング素子と負荷側バスバー（Ｕ相側バスバー、Ｖ相側バスバー、Ｗ相バスバー）との間の接続関係について開示しているものの、各スイッチング素子にスイッチング動作を制御する信号を入力するための信号線の取出し口の配置については開示していない。したがって、ＩＰＭの小型化には、信号線の取出し口の配置についても十分な考慮が必要である。

【0008】
それゆえ、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、小型化が可能な半導体モジュールおよびそれを備えるハイブリッド車両の駆動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】
この発明によれば、半導体モジュールは、電源の一方極に接続される第１電源線と、電源の他方極に接続される第２電源線と、第１電源線と第２電源線との間に接続される第１および第２のスイッチング素子と、第１および第２のスイッチング素子が搭載された絶縁基板とを備える。第１電源線は、第１のスイッチング素子の第１電極層に結合されるバスバーからなり、かつ、第２電源線は、絶縁基板上に配設され、第２のスイッチング素子の第２電極層に結合される配線層からなる。
【0010】
上記の半導体モジュールによれば、従来、共に金属部材からなるバスバーで構成されていた第１および第２電源線の一方を配線層として絶縁基板に組込むことにより、当該配線層から絶縁基板への放熱経路が確保される。この結果、配線層の薄層化が可能となるため、半導体モジュールを基板垂直方向において小型化することができる。
【0011】
好ましくは、半導体モジュールは、絶縁基板上に配設され、第１および第２のスイッチング素子の制御電極に制御信号を入力するための信号線層と、第１電源線、第１および第２のスイッチング素子および第２電源線を導通するための第１導線部材と、第１および第２のスイッチング素子の制御電極と信号線層とを導通するための第２導線部材とをさらに備える。信号線層は、第１導線部材と第２導線部材との延在方向が互いに略垂直となるように配置される。
【0012】
上記の半導体モジュールによれば、これまで信号線層を介在して配置されていた一方のスイッチング素子の第１電極層と他方のスイッチング素子の第２電極層とを近接して配置することができる。これにより、電極層に分布するインダクタンスを低減できるため、スイッチング時の誘起電圧（フライバック電圧）を低減することができる。この結果、スイッチング素子を耐圧がより低い小型の素子で構成できるため、半導体モジュールの更なる小型化および低コスト化を図ることができる。
【0013】
好ましくは、第１電極層と第２電極層とは、スイッチング素子の通過電流が互いに逆方向に流れるように配置される。
【0014】
上記の半導体モジュールによれば、各々の電極層の周囲に生じる磁界が互いに逆の回転方向となって相殺されることにより、電極層に分布するインダクタンスを低減することができる。
【0015】
好ましくは、半導体モジュールは、絶縁基板下面に装着された放熱部材をさらに備える。
【0016】
上記の半導体モジュールによれば、配線層から絶縁基板を介して放熱部材に伝搬する放熱経路が形成されるため、配線層の冷却効率をさらに高めることができる。この結果、配線層をより薄層化することができ、半導体モジュールの小型化が促進される。
【0017】
この発明の他の局面によれば、ハイブリッド車両の駆動装置は、内燃機関のクランクシャフトが結合されるダンパと、ダンパの回転軸とその回転軸が重なるように配置される回転電機と、内燃機関の発生した動力に回転電機の発生した動力を合成して駆動軸に伝達する動力伝達機構と、ダンパ、回転電機および動力伝達機構を収容するケースと、回転電機

の制御を行なうパワー制御ユニットとを備える。パワー制御ユニットは、請求項１から請求項４のいずれか１項に記載の半導体モジュールを含み、回転軸方向から投影した場合に、ケースのダンパ、回転電機、および動力伝達機構を収容する部分の投影部の車両搭載時の水平方向の寸法に収まるように、ケース内に配置される。

【0018】

上記のハイブリッド車両の駆動装置によれば、コンパクトなハイブリッド車両の駆動装置が実現される。

【0019】

この発明の他の局面によれば、ハイブリッド車両の駆動装置は、内燃機関のクランクシャフトが結合されるダンパと、ダンパの回転軸とその回転軸が重なるように配置される回転電機と、内燃機関の発生した動力に回転電機の発生した動力を合成して駆動軸に伝達する動力伝達機構と、ダンパ、回転電機および動力伝達機構を収容するケースと、回転電機の制御を行なうパワー制御ユニットとを備える。パワー制御ユニットは、請求項１から請求項４のいずれか１項に記載の半導体モジュールを含み、回転軸方向から投影した場合に、ケースのダンパ、回転電機、および動力伝達機構を収容する部分の投影部の車両搭載時の鉛直方向の寸法に収まるように、ケース内に配置される、ハイブリッド車両の駆動装置。

【0020】

上記のハイブリッド車両の駆動装置によれば、インバータが一体化され小型化されたハイブリッド車両の駆動装置が実現される。

【0021】

好ましくは、パワー制御ユニットは、回転電機の回転中心軸に対する一方側に配置されるリアクトルと、回転電機の回転中心軸に対する他方側に配置されるコンデンサとをさらに含む。

【0022】

上記のハイブリッド車両の駆動装置によれば、高さを低く抑えつつコンパクトなハイブリッド車両の駆動装置を実現することができる。さらに、車両の重心を低くすることができ、走行安定性を増すことができる。

【発明の効果】

【0023】

この発明によれば、電源に接続される第１および第２電源線の一方を配線層として絶縁基板に組込むことにより、半導体モジュールを法線方向に小型化することができる。

【0024】

また、隣り合うスイッチング素子の第１電極層と第２電極層とを近接して配置できるため、電極層に分布するインダクタンスを低減することができる。この結果、スイッチング素子を小型化することができ、半導体モジュールの更なる小型化および低コスト化を図ることができる。

【0025】

さらに、この発明による半導体モジュールをハイブリッド車両の駆動装置に搭載することにより、車両搭載時の鉛直方向に小型化することができる。また、車両の重心位置を低くすることができ、走行安定性を増すことができる。

【発明を実施するための最良の形態】

【0026】

以下、この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、図中同一符号は同一または相当部分を示す。

【0027】

図１は、この発明による半導体モジュールを搭載したモータ駆動装置の概略ブロック図である。

【0028】

図１を参照して、モータ駆動装置１００は、バッテリＢと、コンデンサＣ１，Ｃ２と、

昇圧コンバータ１２と、インバータ１４，３１と、制御装置３０とを備える。

【0029】

モータジェネレータＭＧ１，ＭＧ２は、三相交流回転電機である。モータジェネレータＭＧ１，ＭＧ２は、発電機としても電動機としても機能し得るが、モータジェネレータＭＧ１は、主として発電機として動作し、モータジェネレータＭＧ２は、主として電動機として動作する。

【0030】

昇圧コンバータ１２は、リアクトルＬ１と、スイッチング素子Ｑ１，Ｑ２と、ダイオードＤ１，Ｄ２とを含む。リアクトルＬ１の一方端はバッテリＢの電源ラインＬＮ１に接続され、他方端はスイッチング素子Ｑ１とスイッチング素子Ｑ２との中間点、すなわち、スイッチング素子Ｑ１のエミッタとスイッチング素子Ｑ２のコレクタとの間に接続される。スイッチング素子Ｑ１，Ｑ２は、電源ラインＬＮ１とアースラインＬＮ２との間に直列に接続される。そして、スイッチング素子Ｑ１のコレクタは電源ラインＬＮ１に接続され、スイッチング素子Ｑ２のエミッタはアースラインＬＮ２に接続される。また、スイッチング素子Ｑ１，Ｑ２のコレクターエミッタ間には、エミッタ側からコレクタ側へ電流を流すダイオードＤ１，Ｄ２がそれぞれ接続されている。

【0031】

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とから成る。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ＬＮ１とアースラインＬＮ２との間に並列に設けられる。

【0032】

Ｕ相アーム１５は、直列接続されたスイッチング素子Ｑ３，Ｑ４から成り、Ｖ相アーム１６は、直列接続されたスイッチング素子Ｑ５，Ｑ６から成り、Ｗ相アーム１７は、直列接続されたスイッチング素子Ｑ７，Ｑ８から成る。また、各スイッチング素子Ｑ３～Ｑ８のコレクターエミッタ間には、エミッタ側からコレクタ側へ電流を流すダイオードＤ３～Ｄ８がそれぞれ接続されている。

【0033】

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、Ｕ，Ｖ，Ｗ相の３つのコイルの一端が中性点に共通接続されて構成され、Ｕ相コイルの他端がスイッチング素子Ｑ３，Ｑ４の中間点に、Ｖ相コイルの他端がスイッチング素子Ｑ５，Ｑ６の中間点に、Ｗ相コイルの他端がスイッチング素子Ｑ７，Ｑ８の中間点にそれぞれ接続されている。

【0034】

インバータ３１は、インバータ１４と同様の構成から成る。なお、昇圧コンバータ１２およびインバータ１４，３１に含まれるスイッチング素子Ｑ１～Ｑ８は、たとえばＭＯＳトランジスタが適用される。

【0035】

バッテリＢは、たとえばニッケル水素電池やリチウムイオン電池などの２次電池セルを多数直列に接続して構成される高電圧のバッテリである。なお、バッテリＢを、これらの２次電池以外に、キャパシタ、コンデンサあるいは燃料電池などで構成しても良い。

【0036】

コンデンサＣ１は、バッテリＢから供給された直流電圧を平滑化し、その平滑化した直流電圧を昇圧コンバータ１２へ供給する。

【0037】

昇圧コンバータ１２は、コンデンサＣ１から供給された直流電圧を昇圧してコンデンサＣ２へ供給する。より具体的には、昇圧コンバータ１２は、制御装置３０から信号ＰＷＭＣを受けると、信号ＰＷＭＣによってスイッチング素子Ｑ２がオンされた期間に応じて直流電圧を昇圧してコンデンサＣ２に供給する。

【0038】

また、昇圧コンバータ１２は、制御装置３０から信号ＰＷＭＣを受けると、コンデンサ

Ｃ２を介してインバータ１４および／またはインバータ３１から供給された直流電圧を降圧してバッテリＢを充電する。

【0039】

コンデンサＣ２は、昇圧コンバータ１２からの直流電圧を平滑化し、その平滑化した直流電圧をインバータ１４，３１へ供給する。

【0040】

インバータ１４は、コンデンサＣ２を介してバッテリＢから直流電圧が供給されると、制御装置３０からの信号ＰＷＭＩ１に基づいて直流電圧を交流電圧に変換してモータジェネレータＭＧ１を駆動する。これにより、モータジェネレータＭＧ１は、トルク指令値ＴＲ１に従ったトルクを発生するように駆動される。

【0041】

また、インバータ１４は、モータ駆動装置１００が搭載されたハイブリッド自動車の回生制動時、モータジェネレータＭＧ１が発電した交流電圧を制御装置３０からの信号ＰＷＭＩ１に基づいて直流電圧に変換し、その変換した直流電圧をコンデンサＣ２を介して昇圧コンバータ１２へ供給する。なお、ここで言う回生制動とは、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発電をさせながら車両を減速（または加速の中止）させることを含む。

【0042】

インバータ３１は、コンデンサＣ２を介してバッテリＢから直流電圧が供給されると制御装置３０からの信号ＰＷＭＩ２に基づいて直流電圧を交流電圧に変換してモータジェネレータＭＧ２を駆動する。これにより、モータジェネレータＭＧ２は、トルク指令値ＴＲ２に従ったトルクを発生するように駆動される。

【0043】

また、インバータ３１は、モータ駆動装置１００が搭載されたハイブリッド自動車の回生制動時、モータジェネレータＭＧ２が発電した交流電圧を制御装置３０からの信号ＰＷＭＩ２に基づいて直流電圧に変換し、その変換した直流電圧をコンデンサＣ２を介して昇圧コンバータ１２へ供給する。

【0044】

以上の構成において、インバータ１４，３１と昇圧コンバータ１２とは、一体化されてこの発明による「半導体モジュール」を構成する。なお、昇圧コンバータ１２に含まれるリアクトルＬ１および平滑用のコンデンサＣ２は、比較的大きな部品であるため、半導体モジュールの外部に別途配置される。

【0045】

次に、図２を用いて、この発明による半導体モジュールの具体的構成例を説明する。

図２は、この発明による半導体モジュールの全体構成を示す平面図である。なお、以下の説明では、便宜上、図２の上下方向を縦方向、同左右方向を横方向として説明する。

【0046】

図２を参照して、半導体モジュール１０は、絶縁基板５０上を横方向に延在するバスバー４０Ｐ，４０Ｎ，４２Ｐ，４２Ｎと、バスバー４０Ｐ，４０Ｎを挟んでその上下に配置されるスイッチング素子Ｑ１～Ｑ８とを備える。

【0047】

絶縁基板５０は、たとえばポリミイドからなる。なお、絶縁基板５０をポリミイドとした場合は、窒化アルミニウムとした場合に対して熱膨張などにより基板に発生する応力に対する耐久性が向上するため、大面積化に有利である。

【0048】

さらに、絶縁基板５０の下面には、放熱板６０が取り付けられている。放熱板６０は、後述するように半導体モジュール１０の冷却を行なうものである。

【0049】

バスバー４０Ｐは、図１の昇圧コンバータ１２－インバータ１４，３１間を結ぶ電源ラ

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
112 of 584

インＬＮ１を構成し、バスバー４０Ｎは、図１の昇圧コンバータ１２－インバータ１４，３１間を結ぶアースラインＬＮ２を構成する。バスバー４０Ｐとバスバー４０Ｎとは、後述するように、図示しない絶縁部材を介在して絶縁基板５０の法線方向（紙面垂直方向に相当）に積層されてなる。

【0050】

さらに、バスバー４０Ｐはスイッチング素子Ｑ１を介してバスバー４２Ｐに接続され、バスバー４０Ｎはスイッチング素子Ｑ２を介してバスバー４２Ｎに接続される。バスバー４２Ｐ，４２Ｎはそれぞれ、図示しないバッテリＢの正極および負極に接続される。すなわち、バスバー４０Ｐとバスバー４２Ｐとが一体となって図１の電源ラインＬＮ１を構成し、バスバー４０Ｎとバスバー４２Ｎとが一体となって図１のアースラインＬＮ２を構成する。

【0051】

そして、バスバー４０Ｐ，４０Ｎの上側に配置されるスイッチング素子Ｑ３～Ｑ８は、図１のインバータ３１を構成する。バスバー４０Ｐ，４０Ｎの下側に配置されるスイッチング素子Ｑ３～Ｑ８は、図１のインバータ１４を構成する。そして、バスバー４０Ｐ，４０Ｎの上下にそれぞれ配置されるスイッチング素子Ｑ１，Ｑ２は、図１の昇圧コンバータ１２を構成する。

【0052】

たとえば図２の例では、紙面右側から左側に向けて順に、インバータ１４，３１のＵ相アーム１５（スイッチング素子Ｑ３，Ｑ４）、インバータ１４，３１のＶ相アーム１６（スイッチング素子Ｑ５，Ｑ６）、およびインバータ１４，３１のＷ相アーム１７（スイッチング素子Ｑ７，Ｑ８）が配置される。なお、スイッチング素子Ｑ３～Ｑ８は、各々、並列に配された２個のスイッチング素子で構成されるが、これは、通過電流の増大によってスイッチング素子に過大な負荷がかかるのを防止したことによる。

【0053】

インバータ１４，３１の各相アームにおいて、バスバー４０Ｐとバスバー４０Ｎとの間に直列接続される２個のスイッチング素子は、絶縁基板５０上にパターンとして形成された電極層と各スイッチング素子とをワイヤによって接続することにより形成される。

【0054】

図３は、インバータ１４，３１の３相アーム１５～１７の具体的な構成を示す平面図である。なお、３相アーム１５～１７はともに共通の構成からなるため、図３では代表的にインバータ１４，３１のＵ相アーム１５の構成を説明する。

【0055】

図４は、図３のＩＶ－ＩＶにおける断面図である。

図３，図４を参照して、インバータ３１のＵ相アーム１５は、バスバー４０Ｐ，４０Ｎの上側に配置され、スイッチング素子Ｑ３，Ｑ４と、Ｐ電極層３１ＰＵと、中間電極層３１Ｕと、Ｎ電極層３１ＮＵとを含む。

【0056】

Ｐ電極層３１ＰＵ、中間電極層３１ＵおよびＮ電極層３１ＮＵはともに、絶縁基板５０上にパターンとして形成される。Ｐ電極層３１ＰＵは、一方端が電源ラインＬＮ１を構成するバスバー４０Ｐに結合される。Ｎ電極層３１ＮＵは、一方端がアースラインＬＮ２を構成するバスバー４０Ｎに結合される。中間電極層３１Ｕは、図１のＵ相アーム１５の中間点に相当し、図示しないバスバーを介してモータジェネレータＭＧ２のＵ相コイル端に接続される。

【0057】

スイッチング素子Ｑ３は、コレクタが中間電極層３１Ｕに導通するように中間電極層３１Ｕに固着される。スイッチング素子Ｑ３のエミッタは、ワイヤＷＬ１によりＰ電極層３１ＰＵに接続される。

【0058】

スイッチング素子Ｑ４は、コレクタがＮ電極層３１ＮＵに導通するようにＮ電極層３１

ＮＵに固着される。スイッチング素子Ｑ４のエミッタは、ワイヤＷＬ１により中間電極層３１Ｕに接続される。

【0059】

なお、スイッチング素子Ｑ３，Ｑ４としてＭＯＳトランジスタを適用した場合、スイッチング素子Ｑ３，Ｑ４はダイオードＤ３，Ｄ４の整流特性をも兼ね備えるため、ダイオードＤ３，Ｄ４と一体化される。

【0060】

絶縁基板５０は、下面が半田５２によって放熱板６０に接着されることによって放熱板６０に固着される。放熱板６０は、シリコングリス６２を介してヒートシンク７０上に配置される。

【0061】

ヒートシンク７０は、複数の溝７２を有する。インバータ１４，３１の冷却系として水冷系を採用した場合、半導体モジュール１０外部に配されたラジエータ（図示せず）から供給された冷却水は、ヒートシンク７０の複数の溝７２を紙面に垂直な方向に流れることによって放熱板６０および絶縁基板５０を介してスイッチング素子Ｑ３，Ｑ４を冷却する。

【0062】

図５は、図３のＶ－Ｖにおける断面を示す図である。

図５を参照して、インバータ３１のＵ相アーム１５における中間電極層３１Ｕと、インバータ１４のＵ相アーム１５における中間電極層１４Ｕとは、絶縁基板５０の縦方向（紙面に左右方向に相当）に配置される。中間電極層３１Ｕおよび中間電極層１４Ｕの各々には、スイッチング素子Ｑ３が固着されている。

【0063】

そして、中間電極層３１Ｕと中間電極層１４Ｕとの間には、バスバー４０Ｐ，４０Ｎが配置される。バスバー４０Ｐとバスバー４０Ｎとは、絶縁部材８０を介して絶縁基板５０の法線方向に積層されている。

【0064】

ここで、積層構造からなるバスバー４０Ｐ，４０Ｎのうちの上層側に位置するバスバー４０Ｐは、金属部材、たとえば銅からなる。これに対し、バスバー４０Ｐ，４０Ｎのうちの下層側に位置するバスバー４０は、絶縁基板５０上に形成された配線層からなる。

【0065】

この発明による半導体モジュールは、このように、電源ラインＬＮ１およびアースラインＬＮ２をそれぞれ構成するバスバー４０Ｐ，４０Ｎの一方を配線層とすることを特徴的な構成とする。

【0066】

かかる構成により、この発明による半導体モジュールは、バスバー４０Ｐ，４０Ｎをともに金属部材で構成する従来の半導体モジュールと比較して、以下のような効果を奏する。

【0067】

詳細には、バスバー４０Ｐ，４０Ｎは、バッテリＢとモータジェネレータＭＧ１，ＭＧ２との間で行なわれる電力授受の媒体となるため、各々について紙面に垂直な方向に電流が流れる。このとき、バスバー４０Ｐ，４０Ｎには、その通過電流と内部抵抗とに比例した熱が発生する。そこで、従来の半導体モジュールでは、通過電流の増大によってバスバー４０Ｐ，４０Ｎが過熱するのを防止するために、各バスバーに、断面積が大きい金属部材を採用して内部抵抗の低減を図っていた。そのため、半導体モジュールは、法線方向において２つの金属部材相当分だけ増長されたものとなってしまい、法線方向における小型化に限界が生じていた。

【0068】

これに対して、この発明による半導体モジュール１０は、一方のバスバー４０Ｎを配線層として、絶縁基板５０に固着させたことにより、バスバー４０Ｎの放熱を確保しながら

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
114 of 584

、法線方向における小型化を実現することができる。

【0069】

すなわち、バスバー４０Ｎを配線層としたことにより、バスバー４０Ｎで生じた熱は、絶縁基板５０、放熱板６０およびヒートシンク７０の複数の溝７２を介して冷却水に放熱される。これにより、バスバー４０Ｎの放熱性が確保されるため、バスバー４０Ｎを比較的断面積の小さい配線層で構成することができる。結果として、半導体モジュール１０の法線方向の長さ（図中のｈ１に相当）を大幅に低減することができる。

【0070】

以上のように、この発明による半導体モジュールは、バスバーに配線層を用いた構成により法線方向における小型化を実現する。さらに、この発明による半導体モジュールは、以下に述べるように、スイッチング素子Ｑ１，Ｑ２およびスイッチング素子Ｑ３～Ｑ８のゲートに制御装置３０からの信号ＰＷＭＣまたはＰＷＭＩを入力するための信号線の配置構造に特徴を有する。

【0071】

図６は、この発明による半導体モジュールの要部構成を示す平面図である。なお、図６の構成は、図３に示したインバータ１４，３１のＵ相アーム１５の構成に対して、スイッチング素子Ｑ３，Ｑ４のゲートに信号ＰＷＭＩを入力するための信号線層１４Ｇ３，１４Ｇ４，３１Ｇ３，３１Ｇ４を付加したものである。

【0072】

詳細には、図６を参照して、インバータ３１のＵ相アーム１５におけるスイッチング素子Ｑ３に対応する信号線層３１Ｇ３は、中間電極層３１Ｕの上下にそれぞれ配置される。なお、中間電極層３１Ｕの下側にある信号線層３１Ｇ３については、半導体モジュール１０の法線方向に沿ってバスバー４０Ｐよりも上方に配置される。信号線層３１Ｇ３は、ワイヤＷＬ２によりスイッチング素子Ｑ３のゲートに接続される。

【0073】

同様に、インバータ３１のＵ相アーム１５におけるスイッチング素子Ｑ４に対応する信号線層３１Ｇ４は、Ｎ電極層３１ＮＵの上下にそれぞれ配置される。なお、Ｎ電極層３１ＮＵの下側にある信号線層３１Ｇ４については、半導体モジュール１０の法線方向に沿ってバスバー４０Ｐよりも上方に配置される。信号線層３１Ｇ４は、ワイヤＷＬ２によりスイッチング素子Ｑ４のゲートに接続される。

【0074】

なお、インバータ１４のＵ相アーム１５に対応する信号線層１４Ｇ３，１４Ｇ４は、信号線層３１Ｇ３，３１Ｇ４と同様の構成からなる。そして、信号線層１４Ｇ３，１４Ｇ４，３１Ｇ３，３１Ｇ４は、半導体モジュール１０の法線方向に沿って上方に配置され、制御装置３０を搭載する制御基板（図示せず）に接続される。そして、Ｕ相アーム１５を基本単位として、各相アーム１５～１７が半導体モジュール１０の横方向に沿って配列される。

【0075】

各相アームに対応する信号線層を図６のような配置構造としたことにより、半導体モジュール１０の横方向に、Ｐ電極層３１ＰＵ～スイッチング素子Ｑ３～中間電極層３１Ｕ～スイッチング素子Ｑ４～Ｎ電極層３１ＮＵに至る電流経路が形成される。そして、半導体モジュール１０の縦方向、すなわち、当該電流経路と略垂直な方向に制御信号ＰＷＭＩ２の入力経路が形成される。

【0076】

かかる構造は、制御信号の入力経路を電流経路と同方向に形成する図７に示す配置構造に対して、以下のような効果を奏する。

【0077】

詳細には、図７に示すように、各相アーム１５～１７に対応する信号線層を、他の電極層と同様に半導体モジュールの横方向に沿って配置した場合を考える。

【0078】

図７を参照して、各相アーム１５～１７は、Ｕ相アーム１５を基本単位として半導体モジュールの横方向に沿って配列される。そのため、Ｕ相アーム１５とＶ相アーム１６との境界において、インバータ３１のＶ相アーム１６に対応する信号線層３１Ｇ５は、Ｕ相アーム１５のＰ電極層３１ＰＵとＶ相アーム１６のＮ電極層３１ＮＶとの間に配置される．また、インバータ１４のＶ相アーム１６に対応する信号線層１４Ｇ５は、Ｕ相アーム１５のＰ電極層１４ＰＵとＶ相アーム１６のＮ電極層１４ＮＶとの間に配置される。

【0079】

すなわち、Ｕ相アーム１５のＰ電極層３１ＰＵ（または１４ＰＵ）と、Ｖ相アーム１６のＮ電極層３１ＮＶ（または１４ＮＶ）とは，信号線層３１Ｇ５（または１４Ｇ５）の横方向長さに応じた間隔を持って配置されることになる．

【0080】

これに対して、図６の配置構造によれば、Ｕ相アーム１５のＰ電極層３１ＰＵ（または１４ＰＵ）と、Ｖ相アーム１６のＮ電極層３１ＮＶ（または１４ＮＶ）とは、信号線層３１Ｇ５（または１４Ｇ５）を介在せず、近接して配置することが可能となる。

【0081】

このようにＰ電極層と隣り合うアームのＮ電極層とを近接配置することにより、この発明による半導体モジュール１０は、各電極層に分布するインダクタンスを低減できるという効果を奏する。

【0082】

たとえば近接するＰ電極層３１ＰＵとＮ電極層３１ＮＶとでは、その電流の方向が互いに逆方向となる．本実施の形態では，バスバー４０ＰからＰ電極層３１ＰＵへ電流が流れる一方、Ｎ電極層３１ＮＶからバスバー４０Ｎへ電流が流れる。このため、これらの電流によりＰ電極層３１ＰＵおよびＮ電極層３１ＮＶの周囲にそれぞれ生じる磁界の方向は、互いに逆の回転方向となる。すなわち、このような構成により、Ｐ電極層３１ＰＵおよびＮ電極層３１ＮＶのインダクタンスを低減することができる。この結果、インダクタンスに起因して生じるスイッチング時のフライバック電圧が低減される。フライバック電流の低減は、より高速なスイッチングを実現する。さらに、フライバック電圧を吸収可能なように高耐圧のスイッチング素子で構成されていたインバータ１４，３１を、耐圧がより低い小型のスイッチング素子で構成することが可能となる。したがって、半導体モジュール１０の更なる小型化および低コスト化を図ることができる。

【0083】

なお、上記の実施の形態においては、昇圧コンバータ１２およびインバータ１４，３１における各アームが１つの半導体モジュールとしてパッケージ化される場合について説明したが、半導体モジュールの構成は、これに限られるものではなく、たとえば、同相の上下アーム毎、あるいはインバータ全体および昇圧コンバータ全体を１つの半導体モジュールとしてパッケージ化してもよい。

【0084】

［この発明による半導体モジュールの適用例］

最後に、この発明による半導体モジュールの適用例として、半導体モジュールを含むモータ駆動装置とモータとを１つのケースに収めたハイブリッド車両の駆動装置について説明する。

【0085】

現状のハイブリッド車両の駆動装置においては、モータケースの上にインバータを構成する大きな箱型のケースを載せただけの構成が多く採られているところ、以下に述べる本願発明によるハイブリッド車両の駆動装置は、高さ方向に関し車両に搭載した場合の車両重心位置の改善、および搭載スペースの省スペース化を実現するものである。

【0086】

図８は、この発明によるハイブリッド車両２００のモータジェネレータ制御に関する構成を示す回路図である。なお、図８のハイブリッド車両２００は、図１のモータ駆動装置１００に動力分割機構ＰＳＤおよび減速機ＲＤを付加して、これらを含む駆動装置２０を

新たに構成したものである。

【0087】

図８を参照して、車両２００は、バッテリＢと、駆動装置２０と、制御装置３０と、図示しないエンジンおよび車輪とを含む。

【0088】

駆動装置２０は、モータジェネレータＭＧ１，ＭＧ２と、動力分割機構ＰＳＤと、減速機ＲＤと、モータジェネレータＭＧ１，ＭＧ２の制御を行なうパワー制御ユニット２１とを備える。

【0089】

動力分割機構ＰＳＤは、基本的には、エンジン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。

【0090】

動力分割機構ＰＳＤの２つの回転軸がエンジン、モータジェネレータＭＧ１の各回転軸にそれぞれ接続され、他の１つの回転軸は減速機ＲＤに接続される。動力分割機構ＰＳＤと一体化された減速機ＲＤによってモータジェネレータＭＧ２の回転は減速されて動力分割機構ＰＳＤに伝達される。

【0091】

なお減速機の回転軸は、後に説明するように図示しない減速ギヤやディファレンシャルギヤによって車輪に結合されている。

【0092】

パワー制御ユニット２１は、モータジェネレータＭＧ１，ＭＧ２にそれぞれ対応して設けられるインバータ１４，３１と、インバータ１４，３１に共通して設けられる昇圧コンバータ１２とを含む。

【0093】

ここで、パワー制御ユニット２１において、インバータ１４，３１の３相アーム１５～１７と昇圧コンバータ１２のアーム部とは、一体化されて半導体モジュール１０を構成する。半導体モジュール１０は、上述した図１のモータ駆動装置１００に搭載される半導体モジュール１０と同一の構成であるために、その詳細な説明は省略する。

【0094】

図９は、図８における動力分割機構ＰＳＤおよび減速機ＲＤの詳細を説明するための模式図である。

【0095】

図９を参照して、この車両駆動装置は、モータジェネレータＭＧ２と、モータジェネレータＭＧ２の回転軸に接続される減速機ＲＤと、減速機ＲＤで減速された回転軸の回転に応じて回転する車軸と、エンジンＥＮＧと、モータジェネレータＭＧ１と、減速機ＲＤとエンジンＥＮＧとモータジェネレータＭＧ１との間で動力分配を行なう動力分割機構ＰＳＤとを備える。減速機ＲＤは、モータジェネレータＭＧ２から動力分割機構ＰＳＤへの減速比が、たとえば２倍以上である。

【0096】

エンジンＥＮＧのクランクシャフト５００とモータジェネレータＭＧ１のロータ３２０とモータジェネレータＭＧ２のロータ３７０とは同じ軸を中心に回転する。

【0097】

動力分割機構ＰＳＤは、図９に示す例ではプラネタリギヤであり、クランクシャフト５００に軸中心を貫通された中空のサンギヤ軸に結合されたサンギヤ５１０と、クランクシャフト５００と同軸上を回転可能に支持されているリングギヤ５２０と、サンギヤ５１０とリングギヤ５２０との間に配置され、サンギヤ５１０の外周を自転しながら公転するピニオンギヤ５３０と、クランクシャフト５００の端部に結合され各ピニオンギヤ５３０の回転軸を支持するプラネタリキャリヤ５４０とを含む。

【0098】
動力分割機構ＰＳＤは、サンギヤ５１０に結合されたサンギヤ軸と、リングギヤ５２０に結合されたリングギヤケースおよびプラネタリキャリヤ５４０に結合されたクランクシャフト５００の３軸が動力の入出力軸とされる．そしてこの３軸のうちいずれか２軸へ入出力される動力が決定されると、残りの１軸に入出力される動力は他の２軸へ入出力される動力に基づいて定まる。
【0099】
動力の取出用のカウンタドライブギヤ７００がリングギヤケースの外側に設けられ、リングギヤ５２０と一体的に回転する。カウンタドライブギヤ７００は、減速ギヤＲＧに接続されている．そしてカウンタドライブギヤ７００と減速ギヤＲＧとの間で動力の伝達がなされる。減速ギヤＲＧはディファレンシャルギヤＤＥＦを駆動する．また、下り坂等では車輪の回転がディファレンシャルギヤＤＥＦに伝達され、減速ギヤＲＧはディファレンシャルギヤＤＥＦによって駆動される。
【0100】
モータジェネレータＭＧ１は、回転磁界を形成するステータ３１０と、ステータ３１０内部に配置され複数個の永久磁石が埋め込まれているロータ３２０とを含む．ステータ３１０は、ステータコア３３０と、ステータコア３３０に巻回される三相コイル３４０とを含む．ロータ３２０は、動力分割機構ＰＳＤのサンギヤ５１０と一体的に回転するサンギヤ軸に結合されている。ステータコア３３０は、電磁鋼板の薄板を積層して形成されており、図示しないケースに固定されている。
【0101】
モータジェネレータＭＧ１は、ロータ３２０に埋め込まれた永久磁石による磁界と三相コイル３４０によって形成される磁界との相互作用によりロータ３２０を回転駆動する電動機として動作する。またモータジェネレータＭＧ１は、永久磁石による磁界とロータ３２０の回転との相互作用により三相コイル３４０の両端に起電力を生じさせる発電機としても動作する。
【0102】
モータジェネレータＭＧ２は、回転磁界を形成するステータ３６０と、ステータ３６０内部に配置され複数個の永久磁石が埋め込まれたロータ３７０とを含む。ステータ３６０は、ステータコア３８０と、ステータコア３８０に巻回される三相コイル３９０とを含む。
【0103】
ロータ３７０は、動力分割機構ＰＳＤのリングギヤ５２０と一体的に回転するリングギヤケースに減速機ＲＤによって結合されている．ステータコア３８０は、たとえば電磁鋼板の薄板を積層して形成されており、図示しないケースに固定されている。
【0104】
モータジェネレータＭＧ２は、永久磁石による磁界とロータ３７０の回転との相互作用により三相コイル３９０の両端に起電力を生じさせる発電機としても動作する。またモータジェネレータＭＧ２は、永久磁石による磁界と三相コイル３９０によって形成される磁界との相互作用によりロータ３７０を回転駆動する電動機として動作する。
【0105】
減速機ＲＤは、プラネタリギヤの回転要素の一つであるプラネタリキャリヤ６６０が車両駆動装置のケースに固定された構造により減速を行なう。すなわち、減速機ＲＤは、ロータ３７０のシャフトに結合されたサンギヤ６２０と、リングギヤ５２０と一体的に回転するリングギヤ６８０と、リングギヤ６８０およびサンギヤ６２０に噛み合いサンギヤ６２０の回転をリングギヤ６８０に伝達するピニオンギヤ６４０とを含む。
【0106】
たとえば、サンギヤ６２０の歯数に対しリングギヤ６８０の歯数を２倍以上にすることにより、減速比を２倍以上にすることができる。
【0107】

図１０は、この発明によるハイブリッド車両の駆動装置２０の外観を示す斜視図である。

【0108】

図１１は、駆動装置２０の平面図である。

図１０、図１１を参照して、駆動装置２０のケースは、ケース１０４とケース１０２とに分割可能に構成されている。ケース１０４は主としてモータジェネレータＭＧ１を収容する部分であり、ケース１０２は、主としてモータジェネレータＭＧ２およびパワー制御ユニット２１を収容する部分である。

【0109】

ケース１０４にはフランジ１０６が形成され、ケース１０２にはフランジ１０５が形成され、フランジ１０６とフランジ１０５とがボルト等で固定されることにより、ケース１０４とケース１０２とが一体化される。

【0110】

ケース１０２にはパワー制御ユニット２１を組付けるための開口部１０８が設けられている。この開口部１０８の内部左側部分（車両進行方向側）にはコンデンサＣ２が収容され、中央部分には半導体モジュール１０と端子台１１６，１１８とが収容され、右側部分にはリアクトルＬ１が収容されている。なお、この開口部１０８は車両搭載状態においては蓋により閉じられている。また、コンデンサＣ２を開口部１０８の内部右側部分に収容し、かつ、リアクトルＬ１を半導体モジュール１０の左側部分に収容するように入れ換えても良い。

【0111】

つまり、リアクトルＬ１はモータジェネレータＭＧ１およびＭＧ２の回転軸の一方側に配置され、コンデンサＣ２は回転軸の他方側に配置される。そしてコンデンサＣ２とリアクトルＬ１との間の領域に半導体モジュール１０が配置されている。半導体モジュール１０の下方にはモータジェネレータＭＧ２が配置されている。

【0112】

半導体モジュール１０は、図2で説明したものと同様の構成を有する。

具体的には、絶縁基板５０の上面にはインバータ１４，３１のスイッチング素子Ｑ１～Ｑ８が配置される。そして、インバータ１４とインバータ３１との間の領域には、絶縁基板５０の法線方向（紙面垂直方向に相当）に重ねて配置されたバスバー４０Ｐ，４０Ｎが設けられている。

【0113】

なお、積層構造の上層側に配置され、電源ラインＬＮ１を構成するバスバー４０Ｐは、金属部材からなる。一方、下層側に配置され、アースラインＬＮ２を構成するバスバー４０Ｎは、配線層からなる。

【0114】

そして、絶縁基板５０の下面には、放熱板６０を介してヒートシンク７０が設けられる（ともに図示せず）。ヒートシンク７０に設けられた複数の溝７２は、通水路を構成しており、通水路への冷却水入口１１４と冷却水出口１１２とがケース１０２に設けられている。この入口や出口などは、たとえば、ケース１０２に対し、フランジ部１０６，１０５を貫通させてユニオンナット等を打ち込んで構成される。

【0115】

なお、通水路を、ヒートシンク７０を介さずに放熱板６０の下面を直接的に冷却水が通流するように構成しても良い。このような構成とすることにより、半導体モジュール１０の法線方向の長さを更に低減することができる。

【0116】

さらに、インバータ１４のU相アーム１５、V相アーム１６、W相アーム１７からはそれぞれ１本ずつのバスバーがモータジェネレータＭＧ２のステータコイルにつながる端子台１１６に向けて設けられている。同様にインバータ３１からも３本のバスバーがモータジェネレータＭＧ１のステータコイルにつながる端子台１１８に向けて設けられている。

【0117】
図１２は、駆動装置２０を図１１のＸ１方向から見た側面図である。
図１２を参照して、ケース１０２にはモータジェネレータ組付け用および保守用の開口部１０９が設けられており、この開口部１０９は車両搭載状態においては蓋により閉じられている。
【0118】
開口部１０９の内部にはモータジェネレータＭＧ２が配置されている。Ｕ，Ｖ，Ｗ相のバスバーが接続されるステータ３６０の内部にロータ３７０が配置されている。ロータ３７０の中央部分には中空のシャフト６００が見えている。
【0119】
図１２に示すように、ケース１０２のパワー制御ユニット２１を収容する収容室にはモータジェネレータＭＧ２のステータ３６０が大きく食い込んでいるので、モータジェネレータＭＧ２の一方側にはリアクトルＬ１が配置され、かつ、他方側にはコンデンサＣ２が配置され、大型部品を効率良く収容している。また、モータジェネレータＭＧ２のステータ３６０の上方には、半導体モジュール１０が配置される。
【0120】
このような配置構造とすることにより、パワー制御ユニット２１を構成するコンデンサＣ２、半導体モジュール１０およびリアクトルＬ１は、車両駆動装置を車両に搭載したときの水平方向の寸法の内側に配置される。なお、水平方向の寸法は、ケースのダンパ１２４、モータジェネレータＭＧ２、減速ギヤＲＧおよびディファレンシャルギヤＤＥＦを収容する部分の投影部によって定まる。これにより、コンパクトなハイブリッド車両の駆動装置が実現される。
【0121】
また、車両搭載時の鉛直方向において、半導体モジュール１０は、ケースの半導体モジュール１０を収容する部分の投影部の車両搭載時の高さが、残りのケースの空間、すなわち、ダンパ１２４、モータジェネレータＭＧ２、減速ギヤＲＧおよびディファレンシャルギヤＤＥＦを収容する部分の車両搭載時の高さを少なくとも超えないように、配置されている。かかる配置は、電源用のバスバー４０Ｐ，４０Ｎの一方を配線層で形成したことによって、半導体モジュール１０の法線方向の長さが大幅に低減されたことに起因するものである。
【0122】
これによれば、パワー制御ユニット２１を構成する半導体モジュール１０、リアクトルＬ１およびコンデンサＣ２は、ディファレンシャルギヤＤＥＦを収容するケース部分の外縁とダンパ１２４を収容するケース部分の外縁とで定まる鉛直方向の寸法の内側に配置されていることがわかる。したがって、車両の重心を低くすることができ、走行安定性を増すことができる。
【0123】
［変更例］
上述したハイブリッド車両の駆動装置においては、半導体モジュール１０を含むパワー制御ユニット２１の冷却系として、一般的な水冷系を採用した。
【0124】
ここで、スイッチング素子としてたとえばＳｉＣ－ＭＯＳなどの高温動作可能な素子を利用すれば、モータジェネレータの耐熱温度と同程度の温度で動作させることが可能となる。したがって、冷却系としてパワー制御ユニット２１専用の水冷系を廃して、モータジェネレータと共通の油冷系を採用することが可能となる。この結果、装置全体をよりコンパクトな構成にすることができる。また、半導体モジュール１０の部分に冷却水の経路を設けなくても冷却が可能となるため、車両の重心をより低くして走行安定性を向上させることができる。
【0125】
以下に、この発明による半導体モジュールが適用されたハイブリッド車両の駆動装置の

変更例として、パワー制御ユニット２１の冷却系に油冷系が採用されたハイブリッド車両の駆動装置について説明する。

【0126】

本変更例では、半導体モジュール１０を含むパワー制御ユニット２１およびモータジェネレータＭＧ１，ＭＧ２は、一部が輻射等で放熱されるが、主として潤滑油との熱交換により冷却が行なわれる。

【0127】

したがって、パワー制御ユニット２１およびモータジェネレータＭＧ１，ＭＧ２において生じた熱は、潤滑油によってモータジェネレータＭＧ１のケースに伝達され、そのケースからエンジンＥＮＧのシリンダブロックにさらに伝達される。シリンダブロックは冷却水によって冷却されるので、温度上昇が抑制される、この結果、パワー制御ユニット２１およびモータジェネレータＭＧ１，ＭＧ２の温度も上昇が抑制されることになる。

【0128】

図１３は、駆動装置２０におけるオイル循環経路を示した断面図である。

図１３を参照して、モータジェネレータＭＧ２を収容する収容室とパワー制御ユニット２１を収容する収容室との境界部分と、減速ギヤＲＧおよびディファレンシャルギヤＤＥＦを収容する部分の各ケース部分断面が示されている。

【0129】

図１４は、図１３のＸＩＶ－ＸＩＶにおける部分断面図である。

図１３、図１４を参照して、ケース１０２にはパワー制御ユニット２１を収容する収容室とモータジェネレータＭＧ２を収容する収容室との２つの空間を仕切る隔壁２１０が設けられている。この隔壁２１０の上面部分には、半導体モジュール１０を冷却するためのオイル通路１２２が設けられ、このオイル通路１２２は、オイル溜り４７０およびモータジェネレータＭＧ２の収容室と連通している。モータジェネレータＭＧ２の潤滑油が半導体モジュール１０側に漏れ出ないように半導体モジュール１０は、隔壁２１０と液状ガスケット等でシールされる。

【0130】

潤滑油は、ケース底部にオイルレベルＯＬまで貯蔵されている．このケース底部はオイルパンに該当する．なお、ケース底部に別途オイルパンを設ける構成としても良い。

【0131】

ロータ３７０の回転等に応じて図９のカウンタドライブギヤ７００が回転される。カウンタドライブギヤ７００によってカウンタドリブンギヤ１３２が回転され、カウンタドリブンギヤ１３２の回転に応じてディファレンシャルギヤＤＥＦが回転する。

【0132】

すると図１３の矢印に示すように、ディファレンシャルギヤＤＥＦが潤滑油を跳ね上げる。ケースの上部にはオイルキャッチ板４８６が設けられており、ディファレンシャルギヤＤＥＦによって掻き揚げられたオイルはオイル溜り４７０に溜められる。オイル溜り４７０は、潤滑油の循環経路において半導体モジュール１０を含むパワー制御ユニット２１の上流部に位置する。オイル溜り４７０にはオイル出口４７２が設けられており、オイル出口４７２は図１４に示すように半導体モジュール１０の下部の空間へのオイル入口４７４，４７６，４７８と通じている。

【0133】

半導体モジュール１０のスイッチング素子の実装面と反対側の裏面には、オイルに熱を放熱するためのフィン４９０，４９２，４９４が設けられており、スイッチング素子の熱はこれらフィンを介して潤滑油に放熱される。その後潤滑油は隔壁２１０に設けられたオイル出口４８０，４８３，４８４を通り、ステータ３６０の上部に注がれる。そして、潤滑油はステータ３６０の外周に沿って流れ、再びケース底部に戻される。

【0134】

以上に説明したように、モータジェネレータを駆動するときに高温となる半導体モジュール１０は、モータジェネレータの潤滑油を利用して冷却される。そして、モータジェネ

レータの内部を循環する潤滑油の熱は、エンジンのハウジング側に放熱される。

【0135】

これにより、一体化したモータおよびインバータの部分に冷却水の経路を設けなくても冷却が可能となる。そのため、半導体モジュール１０においては、水冷系において通水路を構成していたヒートシンク７０が不要となる。この結果、半導体モジュール１０の法線方向の長さを更に低減することができる。したがって、車両の重心をさらに低くできるとともに、省スペース化さらには設計の自由度を向上させることができる。

【0136】

なお、上記の実施の形態においては、半導体モジュールがモータ駆動装置およびハイブリッド車両の駆動装置に用いられる場合を代表的に例示して説明したが、この発明による半導体モジュールの適用範囲は、これらに限られるものではなく、たとえば車両システムにおいてパワー半導体素子が用いられるオルタネータや点火装置においてもこの発明を適用することができる。

【0137】

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、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。

【産業上の利用可能性】

【0138】

この発明は、モータ駆動装置に搭載されるインバータやコンバータを構成する半導体モジュールおよびそれを備えるハイブリッド車両の駆動装置に適用することができる。

【図面の簡単な説明】

【0139】

【図1】この発明による半導体モジュールを搭載したモータ駆動装置の概略ブロック図である。

【図2】この発明による半導体モジュールの全体構成を示す平面図である。

【図3】インバータの３相アームの具体的な構成を示す平面図である。

【図4】図３のＩＶ－ＩＶにおける断面図である。

【図5】図３のＶ－Ｖにおける断面を示す図である。

【図6】この発明による半導体モジュールの要部構成を示す平面図である。

【図7】半導体モジュールの要部構成の他の例を示す平面図である。

【図8】この発明によるハイブリッド車両のモータジェネレータ制御に関する構成を示す回路図である。

【図9】図８における動力分割機構および減速機の詳細を説明するための模式図である。

【図10】この発明によるハイブリッド車両の駆動装置の外観を示す斜視図である。

【図11】駆動装置の平面図である。

【図12】駆動装置を図１１のＸ１方向から見た側面図である。

【図13】駆動装置におけるオイル循環経路を示した断面図である。

【図14】図１３のＸＩＶ－ＸＩＶにおける部分断面図である。

【符号の説明】

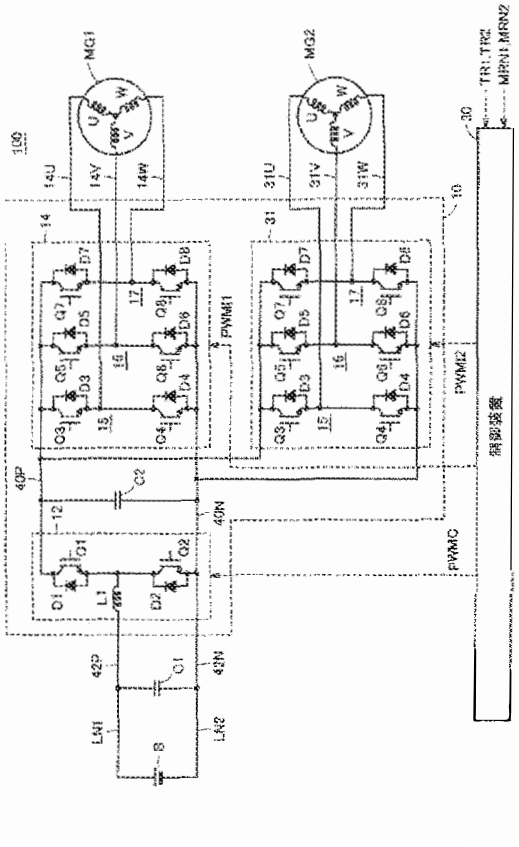
【0140】

１０　半導体モジュール、１２　昇圧コンバータ、１４，３１　インバータ、１４Ｕ，１４Ｖ，１４Ｗ，３１Ｕ，３１Ｖ，３１Ｗ　中間電極層、１４ＰＵ，１４ＰＶ，１４ＰＷ，３１ＰＵ，３１ＰＶ，３１ＰＷ　Ｐ電極層、１４ＮＵ，１４ＮＶ，１４ＮＷ，３１ＮＵ，３１ＮＶ，３１ＮＷ　Ｎ電極層、１４Ｇ３～１４Ｇ６，３１Ｇ３～３１Ｇ６　信号線層、１５　Ｕ相アーム、１６　Ｖ相アーム、１７　Ｗ相アーム、２０　駆動装置、２１　パワー制御ユニット、３０　制御装置、４０Ｐ，４０Ｎ，４２Ｐ，４２Ｎ　バスバー、５０　絶縁基板、５２　半田、６０　シリコングリス、７０　ヒートシンク、７２　溝、８０　絶縁部材、１００　モータ駆動装置、１０２，１０４　ケース、１０５，１０６　フラ

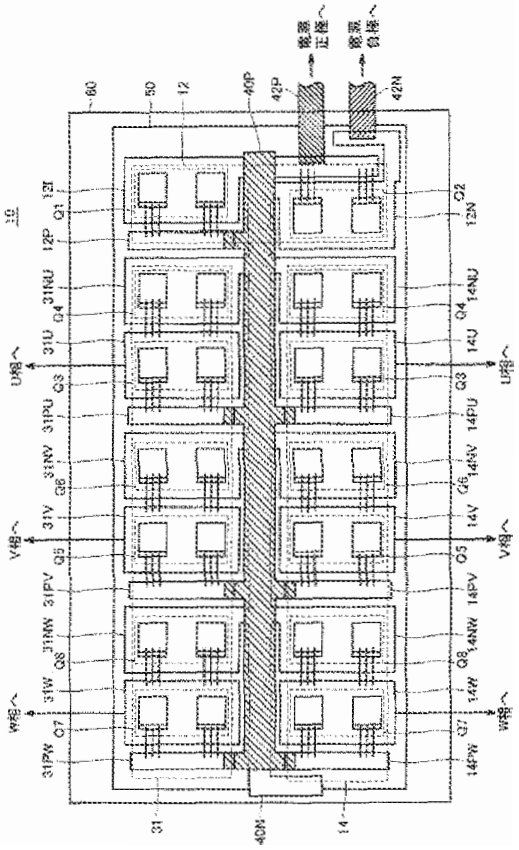
Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
122 of 584

ンジ、１０８，１０９　開口部、１１２　冷却水出口、１１４　冷却水入口、１１６，１１８　端子台、１２２　オイル通路、１２４　ダンパ、２００　車両、２１０　隔壁、３１０，３６０　ステータ、３２０，３７０　ロータ、３３０，３８０　ステータコア、３４０，３９０　三相コイル、４７２，４８０，４８３，４８４　オイル出口、４７４，４７６，４７８　オイル入口、４８６　オイルキャッチ板、４９０，４９２，４９４　フィン、５００　クランクシャフト、５１０，６２０　サンギヤ、５２０，６８０　リングギヤ、５３０，６４０　ピニオンギヤ、５４０，６６０　プラネタリキャリヤ、６００　シャフト、７００　カウンタドライブギヤ、Ｂ　バッテリ、Ｑ１～Ｑ８　スイッチング素子、Ｄ１～Ｄ８　ダイオード、Ｃ１，Ｃ２　コンデンサ、Ｌ１　リアクトル、ＤＥＦ　ディファレンシャルギヤ、ＥＮＧ　エンジン、Ｌ１　リアクトル、ＬＮ１　電源ライン、ＬＮ２　アースライン、ＭＧ１，ＭＧ２　モータジェネレータ、ＰＳＤ　動力分割機構、ＲＧ　減速ギヤ、ＲＤ　減速機、ＷＬ１，ＷＬ２　ワイヤ。

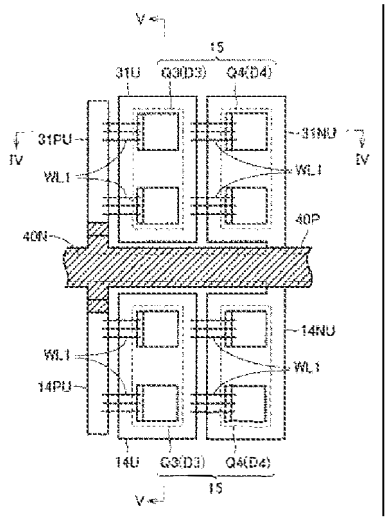
【図1】



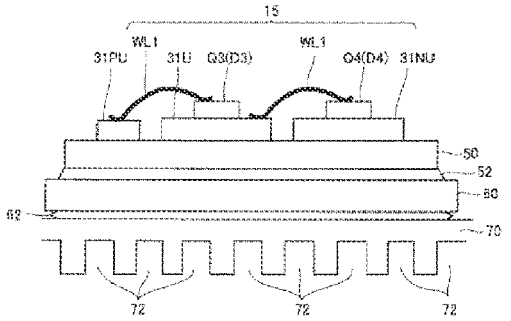
【図2】



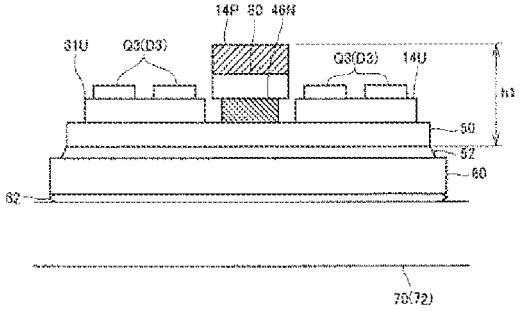
【図3】


V
15
31U
Q3(D3)
Q4(D4)
31PU
31NU
IV
IV
WL1
WL1
40N
40P
14NU
WL1
WL1
14PU
14U
Q3(D3)
Q4(D4)
15
V

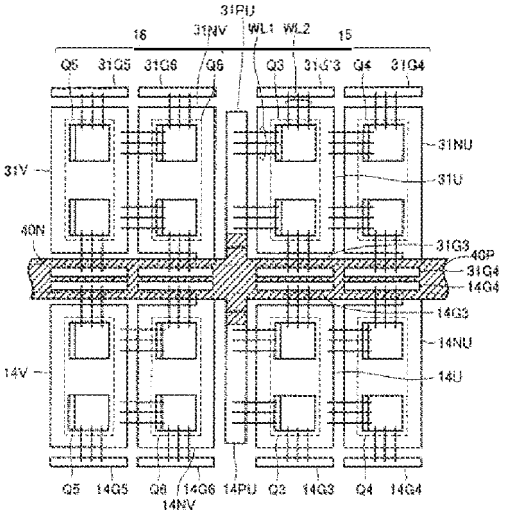
【図4】


15
WL1
WL1
31PU
31U
Q3(D3)
Q4(D4)
31NU
50
52
60
62
70
72
72
72

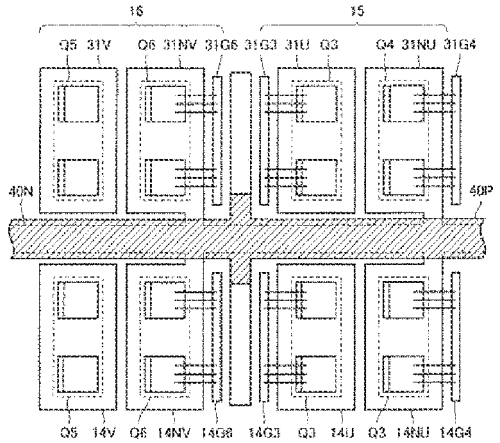
【図5】


14P
80
46N
31U
Q3(D3)
Q3(D3)
14U
h1
50
52
60
62
70(72)

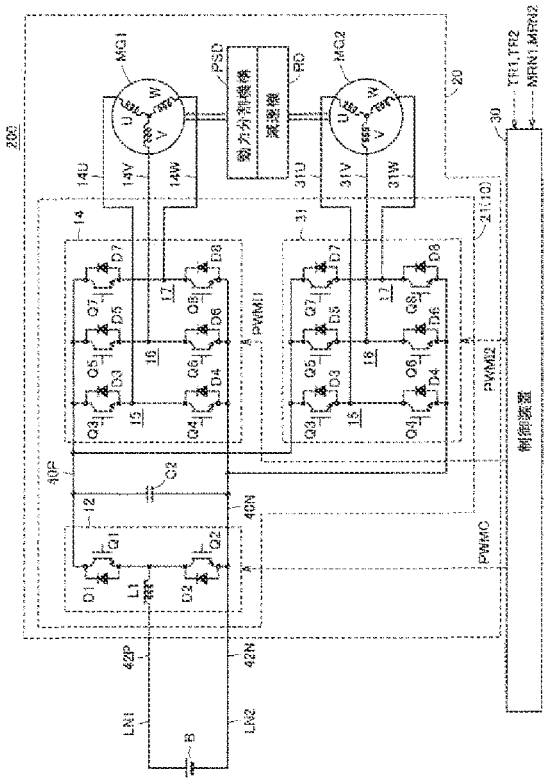
【図6】


31PU
16
31NV
WL1
WL2
15
Q5
31Q5
31Q6
Q6
Q3
31Q3
Q4
31Q4
31NU
31V
31U
40N
31Q3
40P
31Q4
14Q4
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Q3
14Q3
Q4
14Q4

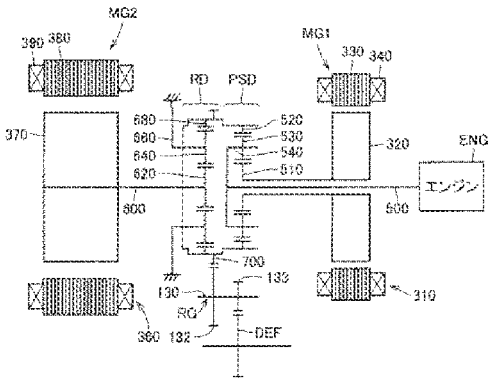
【図7】


16
15
Q5
31V
Q6
31NV
31Q6
31Q3
31U
Q3
Q4
31NU
31Q4
40N
40P
Q5
14V
Q6
14NV
14Q6
14Q3
Q3
14U
Q3
14NU
14Q4

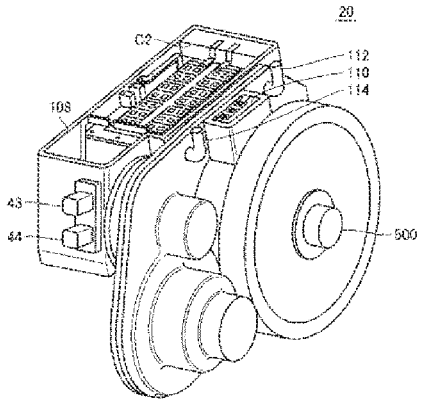
【図８】



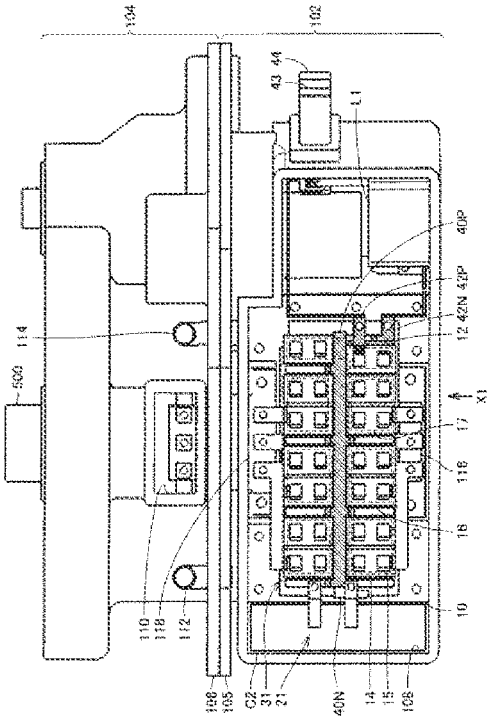
【図９】



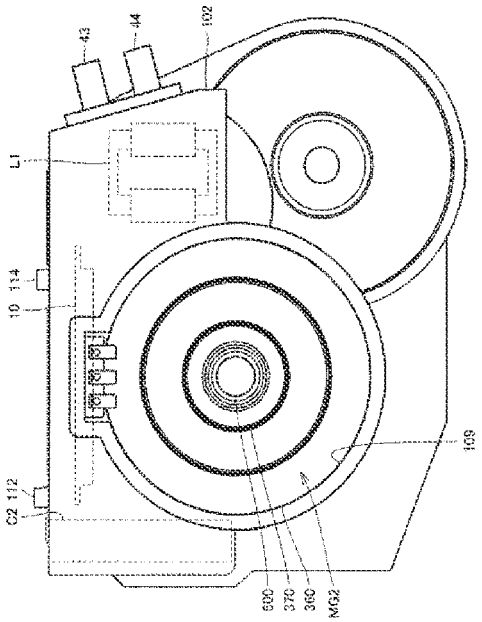
【図１０】



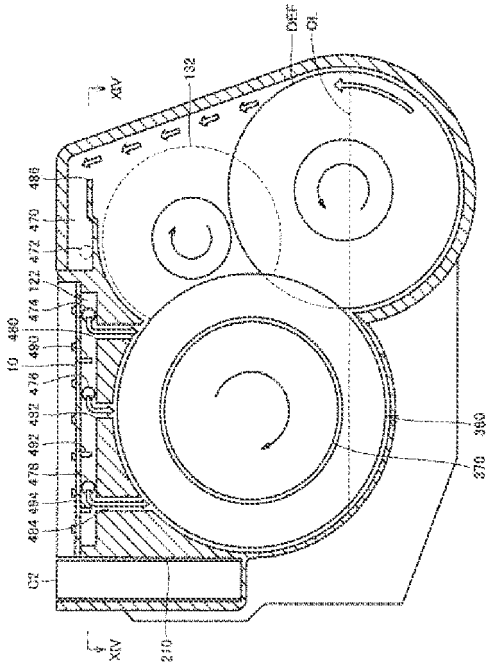
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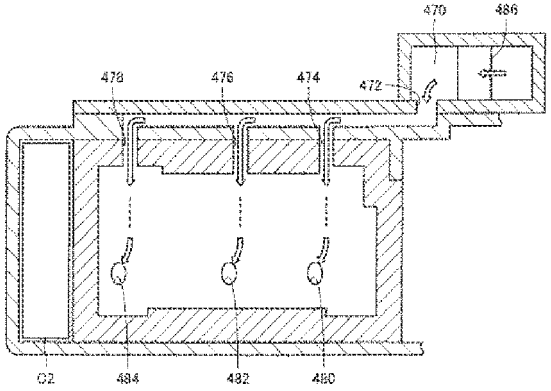
【図１２】



【図13】


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【図14】


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(51)Int.Cl.	ＦＩ	テーマコード（参考）
	Ｂ６０Ｋ　6/04　１００	

Electronic Acknowledgement Receipt

EFS ID:	42320913
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	30-MAR-2021
Filing Date:	04-MAY-2020
Time Stamp:	14:24:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

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)	256975US11_IDS.pdf	1034657 1c8f3d4c93df10d41084a5133cbe8d448f859db6	no	4

Warnings:

Information:					
2	Foreign Reference	256975US11_JP2007220976.pdf	14171725 238a8c86800226cb030aedf34a3ea68901e53d3d	no	22
Warnings:					
Information:					
		Total Files Size (in bytes):	15206382		

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New Applications Under 35 U.S.C. 111

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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.

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	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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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	1					

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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							

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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	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

	1	2004 THS-II-System_Operation	
	2	2008 THS-II-System_Operation	
	3	2010 THS-II-System_Operation	
	4	Case study: Toyota Hybrid Synergy Drive Dr Soheil Seyed Hosseini October 2015 Describes first and second generation THS systems prior to priority date	

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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	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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)	2021-04-15
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 Acknowledgement Receipt

EFS ID:	42465662
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	15-APR-2021
Filing Date:	04-MAY-2020
Time Stamp:	15:54:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

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)	256975US11_IDS.pdf	1034636 0940f16290b31b09c96cb7ef28f0e917eff7a392	no	4

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Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
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Information:					
3	Non Patent Literature	256975US11_NPL2.pdf	192092 9338f725fb74b88e685a68ebfd2bc76e31b6dd9c	no	6
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Warnings:					
Information:					
		Total Files Size (in bytes):	5047597		

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New Applications Under 35 U.S.C. 111

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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.

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	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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
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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]
	1	2055549	EP	A2	2009-06-05	GM Global Technology Operations, Inc.		
	2	2497666	EP	A2	2012-09-12	Yang		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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		Date Considered	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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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)	2021-09-21
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.**

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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.

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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)).

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 055 549 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.05.2009 Bulletin 2009/19

(21) Application number: **08018746.1**

(22) Date of filing: **27.10.2008**

(51) Int Cl.:
B60W 20/00 *(2006.01)* ***B60K 1/02*** *(2006.01)*
B60K 6/26 *(2007.10)* ***B60K 6/365*** *(2007.10)*
B60K 6/445 *(2007.10)* ***B60K 6/547*** *(2007.10)*
F16H 3/72 *(2006.01)* *B60W 10/02* *(2006 01)*
B60W 10/06 *(2006 01)* *B60W 10/08* *(2006 01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **29.10.2007 US 983259 P**
13.10.2008 US 250520

(71) Applicant: **GM Global Technology Operations, Inc.**
Detroit, MI 48265-3000 (US)

(72) Inventors:
- **Heap, Anthony H.**
  Ann Arbor
  Michigan 48105 (US)
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  Sterling Heights
  Michigan 48314 (US)
- **Sah, Jy-Jen F.**
  West Bloomfield
  Michigan 48324 (US)

(74) Representative: **Manitz, Finsterwald & Partner GbR**
Postfach 31 02 20
80102 München (DE)

(54) Method and apparatus to create a pseudo torque phase during oncoming clutch engagement to prevent clutch slip for a hybrid powertrain system

(57) A method for controlling a powertrain comprising an electro-mechanical transmission (10) mechanically-operatively coupled to an engine (14) and an electric machine (56,72) adapted to selectively transmit mechanical power to an output member (64) through selective application of a plurality of torque-transfer clutches (70,62,73,75) includes monitoring a clutch slip speed, synchronizing an oncoming clutch, and constraining reactive clutch torque limits for the oncoming clutch to achieve a reactive clutch torque that is less than an estimated clutch torque capacity.

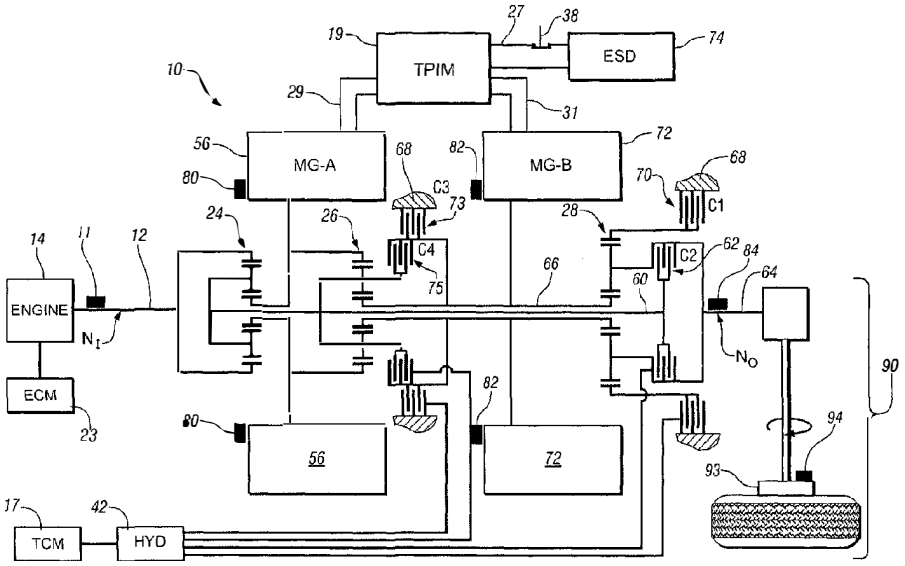


FIG. 1

EP 2 055 549 A2

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Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/983,259 filed on October 29, 2007 which is hereby incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure pertains to control systems for electro-mechanical transmissions.

BACKGROUND

[0003] The statements in this section merely provide background information related to the present disclosure and may not constitute prior art.

[0004] Known powertrain architectures include torque-generative devices, including internal combustion engines and electric machines, which transmit torque through a transmission device to an output member. One exemplary powertrain includes a two-mode, compound-split, electro-mechanical transmission which utilizes an input member for receiving motive torque from a prime mover power source, preferably an internal combustion engine, and an output member. The output member can be operatively connected to a driveline for a motor vehicle for transmitting tractive torque thereto. Electric machines, operative as motors or generators, generate a torque input to the transmission, independently of a torque input from the internal combustion engine. The electric machines may transform vehicle kinetic energy, transmitted through the vehicle driveline, to electrical energy that is storable in an electrical energy storage device. A control system monitors various inputs from the vehicle and the operator and provides operational control of the powertrain, including controlling transmission operating state and gear shifting, controlling the torque-generative devices, and regulating the electrical power interchange among the electrical energy storage device and the electric machines to manage outputs of the transmission, including torque and rotational speed.

[0005] Operation of the above devices within a hybrid drive vehicle require management of numerous torque bearing shafts or devices representing connections to the above mentioned engine, electrical motors, and driveline. Various control schemes and operational connections between the various aforementioned components of the hybrid drive system are known, and the control system must be able to engage and disengage the various components in order to perform the functions of the hybrid drive system. Engagement and disengagement are known to be accomplished through the use of a transmission employing clutches. Clutches are devices well known in the art for engaging and disengaging shafts including the management of rotational velocity and torque differences between the shafts. Engagement or locking, disengagement or unlocking, and operation while engaged or locked operation are all transmission states that must be managed in order for the vehicle to operate properly and smoothly. These implications to vehicle operation are collectively described as part of a vehicle characteristic called drivability.

[0006] Clutches are known in a variety of designs and control methods. One known type of clutch is a mechanical clutch operating by separating or joining two connective surfaces, for instance, clutch plates, operating, when joined, to apply frictional torque to each other. One control method for operating such a mechanical clutch includes applying a hydraulic control system implementing fluidic pressures transmitted through hydraulic lines to exert or release clamping force between the two connective surfaces. Operated thusly, the clutch is not operated in a binary manner, but rather is capable of a range of engagement states, from fully disengaged and desynchronized, to synchronized with no clamping force applied, to engaged but with only minimal clamping force, to engaged with some maximum clamping force. Clamping force applied to the clutch determines how much reactive torque the clutch can carry before the clutch slips. Clutches can be designed to operate with some level of controlled slip in asynchronous operation, or clutches can be designed to operate with little or preferably no slip in synchronous operation. This disclosure deals with clutches designed primarily for synchronous operation. Variable control of clutches through modulation of clamping force allows for transition between locked and unlocked states and further allows for managing slip in a locked transmission. In addition, the maximum clamping force capable of being applied by the hydraulic lines can also vary with vehicle operating states and can be modulated based upon control strategies.

[0007] Slip, or relative rotational movement between the connective surfaces of the clutch, occurs whenever the reactive torque transmitted through the clutch exceeds the actual torque capacity created by the applied clamping force. Slip in a transmission results in unintended loss of control within the transmission and adverse affects to drivability.

[0008] Transitioning from an unlocked to a locked state requires a transitional locking state, through which a clutch begins in an unlocked state with no reactive torque being carried across the clutch, and ends in a locked synchronized state with connective surfaces clamped together. Once a locked state has been achieved, a transitional locking event or a period of ramping the clutch up to a desired or demanded reactive torque is performed. Orderly application of reactive

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
142 of 584

torque through the transitional locking event or state, facilitating optimal drivability of the vehicle without slip, can be difficult to achieve. As described above, whenever the reactive torque transmitted through the clutch exceeds the actual clutch capacity created by the applied clamping force, slip occurs. Because the transitional locking event necessarily involves a rapid increase torque, input torques from the engine and the electric machine or machines creating too much reactive torque through a clutch during a transitional locking event create risk to drivability as potential slip.

SUMMARY

[0009] A method for controlling a powertrain comprising an electro-mechanical transmission mechanically-operatively coupled to an internal combustion engine and an electric machine adapted to selectively transmit mechanical power to an output member through selective application of a plurality of torque-transfer clutches includes monitoring a clutch slip speed, synchronizing an oncoming clutch, and constraining reactive clutch torque limits for the oncoming clutch to achieve a reactive clutch torque that is less than an estimated clutch torque capacity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] One or more embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

[0011] FIG. 1 is a schematic diagram of an exemplary powertrain in accordance with the present disclosure;

[0012] FIG. 2 is a schematic diagram of an exemplary architecture for a control system and powertrain in accordance with the present disclosure;

[0013] FIG. 3 is a schematic diagram of a hydraulic circuit in accordance with the present disclosure;

[0014] FIG. 4 is a graphical representation of a transitional locking event and an associated application of reactive torque to a clutch in accordance with the present disclosure;

[0015] FIG. 5 shows an exemplary control system architecture for controlling and managing torque and power flow in a powertrain system having multiple torque generative devices and residing in control modules in the form of executable algorithms and calibrations, in accordance with the present disclosure;

[0016] FIG. 6 is a schematic diagram exemplifying data flow through a shift execution, describing more detail exemplary execution of the control system architecture of FIG. 5 in greater detail, in accordance with the present disclosure; and

[0017] FIG. 7 is a flowchart demonstrating an exemplary process whereby limits may be imposed upon an engine and electric machine through a transitional locking event in order to prevent slip in accordance with the present disclosure.

DETAILED DESCRIPTION

[0018] Referring now to the drawings, wherein the showings are for the purpose of illustrating certain exemplary embodiments only and not for the purpose of limiting the same, Figs. A and B depict an exemplary electro-mechanical hybrid powertrain. The exemplary electro-mechanical hybrid powertrain in accordance with the present disclosure is depicted in FIG. 1, comprising a two-mode, compound-split, electro-mechanical hybrid transmission 10 operatively connected to an engine 14 and first and second electric machines ('MG-A') 56 and ('MG-B') 72. The engine 14 and first and second electric machines 56 and 72 each generate power which can be transmitted to the transmission 10. The power generated by the engine 14 and the first and second electric machines 56 and 72 and transmitted to the transmission 10 is described in terms of input torques, referred to herein as T_I, T_A, and T_B respectively, and speed, referred to herein as N_I, N_A, and N_B, respectively.

[0019] The exemplary engine 14 comprises a multi-cylinder internal combustion engine selectively operative in several states to transmit torque to the transmission 10 via an input shaft 12, and can be either a spark-ignition or a compression-ignition engine. The engine 14 includes a crankshaft (not shown) operatively coupled to the input shaft 12 of the transmission 10. A rotational speed sensor 11 monitors rotational speed of the input shaft 12. Power output from the engine 14, comprising rotational speed and output torque, can differ from the input speed, N_I, and the input torque, T_I, to the transmission 10 due to placement of torque-consuming components on the input shaft 12 between the engine 14 and the transmission 10, e.g., a hydraulic pump (not shown) and/or a torque management device (not shown).

[0020] The exemplary transmission 10 comprises three planetary-gear sets 24, 26 and 28, and four selectively engageable torque-transmitting devices, i.e., clutches C1 70, C2 62, C3 73, and C4 75. As used herein, clutches refer to any type of friction torque transfer device including single or compound plate clutches or packs, band clutches, and brakes, for example. A hydraulic control circuit 42, preferably controlled by a transmission control module (hereafter 'TCM') 17, is operative to control clutch states. Clutches C2 62 and C4 75 preferably comprise hydraulically-applied rotating friction clutches. Clutches C1 70 and C3 73 preferably comprise hydraulically-controlled stationary devices that can be selectively grounded to a transmission case 68. Each of the clutches C1 70, C2 62, C3 73, and C4 75 is preferably hydraulically applied, selectively receiving pressurized hydraulic fluid via the hydraulic control circuit 42.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
143 of 584

[0021] The first and second electric machines 56 and 72 preferably comprise three-phase AC machines, each including a stator (not shown) and a rotor (not shown), and respective resolvers 80 and 82. The motor stator for each machine is grounded to an outer portion of the transmission case 68, and includes a stator core with coiled electrical windings extending therefrom. The rotor for the first electric machine 56 is supported on a hub plate gear that is operatively attached to shaft 60 via the second planetary gear set 26. The rotor for the second electric machine 72 is fixedly attached to a sleeve shaft hub 66.

[0022] Each of the resolvers 80 and 82 preferably comprises a variable reluctance device including a resolver stator (not shown) and a resolver rotor (not shown). The resolvers 80 and 82 are appropriately positioned and assembled on respective ones of the first and second electric machines 56 and 72. Stators of respective ones of the resolvers 80 and 82 are operatively connected to one of the stators for the first and second electric machines 56 and 72. The resolver rotors are operatively connected to the rotor for the corresponding first and second electric machines 56 and 72. Each of the resolvers 80 and 82 is signally and operatively connected to a transmission power inverter control module (hereafter 'TPIM') 19, and each senses and monitors rotational position of the resolver rotor relative to the resolver stator, thus monitoring rotational position of respective ones of first and second electric machines 56 and 72. Additionally, the signals output from the resolvers 80 and 82 are interpreted to provide the rotational speeds for first and second electric machines 56 and 72, i.e., N_A and N_B, respectively.

[0023] The transmission 10 includes an output member 64, e.g. a shaft, which is operably connected to a driveline 90 for a vehicle (not shown), to provide output power, e.g., to vehicle wheels 93, one of which is shown in FIG. 1. The output power is characterized in terms of an output rotational speed, No and an output torque, T_O. A transmission output speed sensor 84 monitors rotational speed and rotational direction of the output member 64. Each of the vehicle wheels 93, is preferably equipped with a sensor 94 adapted to monitor wheel speed, $V_{SS\text{-}WHL}$, the output of which is monitored by a control module of a distributed control module system described with respect to FIG. 2, to determine vehicle speed, and absolute and relative wheel speeds for braking control, traction control, and vehicle acceleration management.

[0024] The input torques from the engine 14 and the first and second electric machines 56 and 72 (T_I, T_A, and T_B respectively) are generated as a result of energy conversion from fuel or electrical potential stored in an electrical energy storage device (hereafter 'ESD') 74. The ESD 74 is high voltage DC-coupled to the TPIM 19 via DC transfer conductors 27. The transfer conductors 27 include a contactor switch 38. When the contactor switch 38 is closed, under normal operation, electric current can flow between the ESD 74 and the TPIM 19. When the contactor switch 38 is opened electric current flow between the ESD 74 and the TPIM 19 is interrupted. The TPIM 19 transmits electrical power to and from the first electric machine 56 by transfer conductors 29, and the TPIM 19 similarly transmits electrical power to and from the second electric machine 72 by transfer conductors 31, in response to torque commands for the first and second electric machines 56 and 72 to achieve the input torques T_A and T_B. Electrical current is transmitted to and from the ESD 74 in accordance with whether the ESD 74 is being charged or discharged.

[0025] The TPIM 19 includes the pair of power inverters (not shown) and respective motor control modules (not shown) configured to receive the torque commands and control inverter states therefrom for providing motor drive or regeneration functionality to meet the commanded motor torques T_A and T_B. The power inverters comprise known complementary three-phase power electronics devices, and each includes a plurality of insulated gate bipolar transistors (not shown) for converting DC power from the ESD 74 to AC power for powering respective ones of the first and second electric machines 56 and 72, by switching at high frequencies. The insulated gate bipolar transistors form a switch mode power supply configured to receive control commands. There is typically one pair of insulated gate bipolar transistors for each phase of each of the three-phase electric machines. States of the insulated gate bipolar transistors are controlled to provide motor drive mechanical power generation or electric power regeneration functionality.

The three-phase inverters receive or supply DC electric power via DC transfer conductors 27 and transform it to or from three-phase AC power, which is conducted to or from the first and second electric machines 56 and 72 for operation as motors or generators via transfer conductors 29 and 31 respectively.

[0026] FIG. 2 is a schematic block diagram of the distributed control module system. The elements described hereinafter comprise a subset of an overall vehicle control architecture, and provide coordinated system control of the exemplary powertrain described in FIG. 1. The distributed control module system synthesizes pertinent information and inputs, and executes algorithms to control various actuators to achieve control objectives, including objectives related to fuel economy, emissions, performance, drivability, and protection of hardware, including batteries of ESD 74 and the first and second electric machines 56 and 72. The distributed control module system includes an engine control module (hereafter 'ECM') 23, the TCM 17, a battery pack control module (hereafter 'BPCM') 21, and the TPIM 19. A hybrid control module (hereafter 'HCP') 5 provides supervisory control and coordination of the ECM 23, the TCM 17, the BPCM 21, and the TPIM 19. A user interface ('UI') 13 is operatively connected to a plurality of devices through which a vehicle operator controls or directs operation of the electro-mechanical hybrid powertrain. The devices include an accelerator pedal 113 ('AP') from which an operator torque request is determined, an operator brake pedal 112 ('BP'), a transmission gear selector 114 ('PRNDL'), and a vehicle speed cruise control (not shown). The transmission gear selector 114 may have a discrete number of operator-selectable positions, including the rotational direction of the output member 64 to enable

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
144 of 584

one of a forward and a reverse direction.

[0027] The aforementioned control modules communicate with other control modules, sensors, and actuators via a local area network (hereafter 'LAN') bus 6. The LAN bus 6 allows for structured communication of states of operating parameters and actuator command signals between the various control modules. The specific communication protocol utilized is application-specific. The LAN bus 6 and appropriate protocols provide for robust messaging and multi-control module interfacing between the aforementioned control modules, and other control modules providing functionality such as antilock braking, traction control, and vehicle stability. Multiple communications buses may be used to improve communications speed and provide some level of signal redundancy and integrity. Communication between individual control modules can also be effected using a direct link, e.g., a serial peripheral interface ('SPI') bus (not shown).

[0028] The HCP 5 provides supervisory control of the powertrain, serving to coordinate operation of the ECM 23, TCM 17, TPIM 19, and BPCM 21. Based upon various input signals from the user interface 13 and the powertrain, including the ESD 74, the HCP 5 generates various commands, including: the operator torque request ('T_{O_REQ}'), a commanded output torque ('T_{CMD}') to the driveline 90, an engine input torque command, clutch torques for the torque-transfer clutches C 1 70, C2 62, C3 73, C4 75 of the transmission 10; and the torque commands for the first and second electric machines 56 and 72, respectively. The TCM 17 is operatively connected to the hydraulic control circuit 42 and provides various functions including monitoring various pressure sensing devices (not shown) and generating and communicating control signals to various solenoids (not shown) thereby controlling pressure switches and control valves contained within the hydraulic control circuit 42.

[0029] The ECM 23 is operatively connected to the engine 14, and functions to acquire data from sensors and control actuators of the engine 14 over a plurality of discrete lines, shown for simplicity as an aggregate bi-directional interface cable 35. The ECM 23 receives the engine input torque command from the HCP 5. The ECM 23 determines the actual engine input torque, T_I, provided to the transmission 10 at that point in time based upon monitored engine speed and load, which is communicated to the HCP 5. The ECM 23 monitors input from the rotational speed sensor 11 to determine the engine input speed to the input shaft 12, which translates to the transmission input speed, N_I. The ECM 23 monitors inputs from sensors (not shown) to determine states of other engine operating parameters including, e.g., a manifold pressure, engine coolant temperature, ambient air temperature, and ambient pressure. The engine load can be determined, for example, from the manifold pressure, or alternatively, from monitoring operator input to the accelerator pedal 113. The ECM 23 generates and communicates command signals to control engine actuators, including, e.g., fuel injectors, ignition modules, and throttle control modules, none of which are shown.

[0030] The TCM 17 is operatively connected to the transmission 10 and monitors inputs from sensors (not shown) to determine states of transmission operating parameters. The TCM 17 generates and communicates command signals to control the transmission 10, including controlling the hydraulic control circuit 42. Inputs from the TCM 17 to the HCP 5 include estimated clutch torques for each of the clutches, i.e., C 1 70, C2 62, C3 73, and C4 75, and rotational output speed, No, of the output member 64. Other actuators and sensors may be used to provide additional information from the TCM 17 to the HCP 5 for control purposes. The TCM 17 monitors inputs from pressure switches (not shown) and selectively actuates pressure control solenoids (not shown) and shift solenoids (not shown) of the hydraulic control circuit 42 to selectively actuate the various clutches C 1 70, C2 62, C3 73, and C4 75 to achieve various transmission operating range states, as described hereinbelow.

[0031] The BPCM 21 is signally connected to sensors (not shown) to monitor the ESD 74, including states of electrical current and voltage parameters, to provide information indicative of parametric states of the batteries of the ESD 74 to the HCP 5. The parametric states of the batteries preferably include battery state-of-charge, battery voltage, battery temperature, and available battery power, referred to as a range P_{BAT_MIN} to $P_{BAT-MAX}$.

[0032] Each of the control modules ECM 23, TCM 17, TPIM 19 and BPCM 21 is preferably a general-purpose digital computer comprising a microprocessor or central processing unit, storage mediums comprising read only memory ('ROM'), random access memory ('RAM'), electrically programmable read only memory ('EPROM'), a high speed clock, analog to digital ('A/D') and digital to analog ('D/A') circuitry, and input/output circuitry and devices ('I/O') and appropriate signal conditioning and buffer circuitry. Each of the control modules has a set of control algorithms, comprising resident program instructions and calibrations stored in one of the storage mediums and executed to provide the respective functions of each computer. Information transfer between the control modules is preferably accomplished using the LAN bus 6 and SPI buses. The control algorithms are executed during preset loop cycles such that each algorithm is executed at least once each loop cycle. Algorithms stored in the non-volatile memory devices are executed by one of the central processing units to monitor inputs from the sensing devices and execute control and diagnostic routines to control operation of the actuators, using preset calibrations. Loop cycles are executed at regular intervals, for example each 3.125, 6.25, 12.5, 25 and 100 milliseconds during ongoing operation of the powertrain. Alternatively, algorithms may be executed in response to the occurrence of an event.

[0033] The exemplary powertrain selectively operates in one of several operating range states that can be described in terms of an engine state comprising one of an engine on state ('ON') and an engine off state ('OFF'), and a transmission state comprising a plurality of fixed gears and continuously variable operating modes, described with reference to Table

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
145 of 584

1, below.

Table 1

Description	Engine State	Transmission Operating Range State	Applied Clutches	
MI_Eng_Off	OFF	EVT Mode I	C1 70	
MI_Eng_On	ON	EVT Mode I	C1 70	
FG1	ON	Fixed Gear Ratio 1	C1 70	C4 75
FG2	ON	Fixed Gear Ratio 2	C1 70	C2 62
MII_Eng_Off	OFF	EVT Mode II	C2 62	
MII_Eng_On	ON	EVT Mode II	C2 62	
FG3	ON	Fixed Gear Ratio 3	C2 62	C4 75
FG4	ON	Fixed Gear Ratio 4	C2 62	C3 73

[0034] Each of the transmission operating range states is described in the table and indicates which of the specific clutches C 1 70, C2 62, C3 73, and C4 75 are applied for each of the operating range states. A first continuously variable mode, i.e., EVT Mode I, or MI, is selected by applying clutch C 1 70 only in order to "ground" the outer gear member of the third planetary gear set 28. The engine state can be one of ON ('MI_Eng_On') or OFF ('MI_Eng_Off). A second continuously variable mode, i.e., EVT Mode II, or MII, is selected by applying clutch C2 62 only to connect the shaft 60 to the carrier of the third planetary gear set 28. The engine state can be one of ON ('MII_Eng_On') or OFF ('MII_Eng_Off'). For purposes of this description, when the engine state is OFF, the engine input speed is equal to zero revolutions per minute ('RPM'), i.e., the engine crankshaft is not rotating. A fixed gear operation provides a fixed ratio operation of input-to-output speed of the transmission 10, i.e., N_I/N_O, is achieved. A first fixed gear operation ('FG1') is selected by applying clutches C1 70 and C4 75. A second fixed gear operation ('FG2') is selected by applying clutches C1 70 and C2 62. A third fixed gear operation ('FG3') is selected by applying clutches C2 62 and C4 75. A fourth fixed gear operation ('FG4') is selected by applying clutches C2 62 and C3 73. The fixed ratio operation of input-to-output speed increases with increased fixed gear operation due to decreased gear ratios in the planetary gears 24, 26, and 28. The rotational speeds of the first and second electric machines 56 and 72, N_A and N_B respectively, are dependent on internal rotation of the mechanism as defined by the clutching and are proportional to the input speed measured at the input shaft 12.

[0035] In response to operator input via the accelerator pedal 113 and brake pedal 112 as captured by the user interface 13, the HCP 5 and one or more of the other control modules determine the commanded output torque, T_{CMD}, intended to meet the operator torque request, T_{O_REQ}, to be executed at the output member 64 and transmitted to the driveline 90. Final vehicle acceleration is affected by other factors including, e.g., road load, road grade, and vehicle mass. The operating range state is determined for the transmission 10 based upon a variety of operating characteristics of the powertrain. This includes the operator torque request, communicated through the accelerator pedal 113 and brake pedal 112 to the user interface 13 as previously described. The operating range state may be predicated on a powertrain torque demand caused by a command to operate the first and second electric machines 56 and 72 in an electrical energy generating mode or in a torque generating mode. The operating range state can be determined by an optimization algorithm or routine which determines optimum system efficiency based upon operator demand for power, battery state of charge, and energy efficiencies of the engine 14 and the first and second electric machines 56 and 72. The control system manages torque inputs from the engine 14 and the first and second electric machines 56 and 72 based upon an outcome of the executed optimization routine, and system efficiencies are optimized thereby, to manage fuel economy and battery charging. Furthermore, operation can be determined based upon a fault in a component or system. The HCP 5 monitors the torque-generative devices, and determines the power output from the transmission 10 required to achieve the desired output torque to meet the operator torque request. As should be apparent from the description above, the ESD 74 and the first and second electric machines 56 and 72 are electrically-operatively coupled for power flow therebetween. Furthermore, the engine 14, the first and second electric machines 56 and 72, and the electro-mechanical transmission 10 are mechanically-operatively coupled to transmit power therebetween to generate a power flow to the output member 64.

[0036] FIG. 3 depicts a schematic diagram of the hydraulic control circuit 42 for controlling flow of hydraulic fluid in the exemplary transmission. A main hydraulic pump 88 is driven off the input shaft 12 from the engine 14, and an auxiliary pump 110 controlled by the TPIM 19 to provide pressurized fluid to the hydraulic control circuit 42 through valve 140. The auxiliary pump 110 preferably comprises an electrically-powered pump of an appropriate size and capacity to provide sufficient flow of pressurized hydraulic fluid into the hydraulic control circuit 42 when operational. The hydraulic control circuit 42 selectively distributes hydraulic pressure to a plurality of devices, including the torque-transfer clutches C1 70,

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
146 of 584

C2 62, C3 73, and C4 75, active cooling circuits for the first and second electric machines 56 and 72 (not shown), and a base cooling circuit for cooling and lubricating the transmission 10 via passages 142, 144 (not depicted in detail). As previously stated, the TCM 17 actuates the various clutches to achieve one of the transmission operating range states through selective actuation of hydraulic circuit flow control devices comprising variable pressure control solenoids ('PCS') PCS1 108, PCS2 114, PCS3 112, PCS4 116 and solenoid-controlled flow management valves, X-valve 119 and Y-valve 121. The hydraulic control circuit 42 is fluidly connected to pressure switches PS1, PS2, PS3, and PS4 via passages 122, 124, 126, and 128, respectively. The pressure control solenoid PCS1 108 has a control position of normally high and is operative to modulate the magnitude of fluidic pressure in the hydraulic circuit through fluidic interaction with controllable pressure regulator 107 and spool valve 109. The controllable pressure regulator 107 and spool valve 109 interact with PCS 1 108 to control hydraulic pressure in the hydraulic control circuit 42 over a range of pressures and may provide additional functionality for the hydraulic control circuit 42. Pressure control solenoid PCS3 112 has a control position of normally high, and is fluidly connected to spool valve 113 and operative to effect flow therethrough when actuated. Spool valve 113 is fluidly connected to pressure switch PS3 via passage 126. Pressure control solenoid PCS2 114 has a control position of normally high, and is fluidly connected to spool valve 115 and operative to effect flow therethrough when actuated. Spool valve 115 is fluidly connected to pressure switch PS2 via passage 124. Pressure control solenoid PCS4116 has a control position of normally low, and is fluidly connected to spool valve 117 and operative to effect flow therethrough when actuated. Spool valve 117 is fluidly connected to pressure switch PS4 via passage 128.

[0037] The X-Valve 119 and Y-Valve 121 each comprise flow management valves controlled by solenoids 118, 120, respectively, in the exemplary system, and have control states of High ('1') and Low ('0'). The control states refer to positions of each valve to which control flow to different devices in the hydraulic control circuit 42 and the transmission 10. The X-valve 119 is operative to direct pressurized fluid to clutches C3 73 and C4 75 and cooling systems for stators of the first and second electric machines 56 and 72 via fluidic passages 136, 138, 144, 142 respectively, depending upon the source of the fluidic input, as is described hereinafter. The Y-valve 121 is operative to direct pressurized fluid to clutches C 1 70 and C2 62 via fluidic passages 132 and 134 respectively, depending upon the source of the fluidic input, as is described hereinafter. The Y-valve 121 is fluidly connected to pressure switch PS1 via passage 122.

[0038] The hydraulic control circuit 42 includes a base cooling circuit for providing hydraulic fluid to cool the stators of the first and second electric machines 56 and 72. The base cooling circuit includes fluid conduits from the valve 140 flowing directly to a flow restrictor which leads to fluidic passage 144 leading to the base cooling circuit for the stator of the first electric machine 56, and to a flow restrictor which leads to fluidic passage 142 leading to the base cooling circuit for the stator of the second electric machine 72. Active cooling of stators for the first and second electric machines 56 and 72 is effected by selective actuation of pressure control solenoids PCS2 114, PCS3 112 and PCS4 116 and solenoid-controlled flow management valves X-valve 119 and Y-valve 121, which leads to flow of hydraulic fluid around the selected stator and permits heat to be transferred therebetween, primarily through conduction.

[0039] An exemplary logic table to accomplish control of the exemplary hydraulic control circuit 42 to control operation of the transmission 10 in one of the transmission operating range states is provided with reference to Table 2, below.

Table 2

Transmis -sion Operating Range State	X-Valve Logic No Latch	Y-Valve Logic C2 Latch	PCS1 Normal High	PCS2 Normal High	PCS3 Normal High	PCS4 Normal Low
EVT Mode I	0	0	Line Modulation	MG-B Stator Cool	C1	MG-A Stator Cool
EVT Mode II	0	1	Line Modulation	C2	MG-B Stator Cool	MG-A Stator Cool
Low Range	1	0	Line Modulation	C2	C1	C4
High Range	1	1	Line Modulation	C2	C3	C4

[0040] A Low Range is defined as a transmission operating range state comprising one of the first continuously variable mode and the first and second fixed gear operations. A High Range is defined as a transmission operating range state comprising one of the second continuously variable mode and the third and fourth fixed gear operations. Selective control of the X-valve 119 and the Y-valve 121 and actuation of the solenoids PCS2 112, PCS3 114, PCS4 116 facilitate flow of hydraulic fluid to actuate clutches C 1 70, C2 63, C3 73, and C4 75, and provide cooling for the stators the first and

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
147 of 584

second electric machines 56 and 72.

[0041] In operation, a transmission operating range state, i.e. one of the fixed gear and continuously variable mode operations, is selected for the exemplary transmission 10 based upon a variety of operating characteristics of the powertrain. This includes the operator torque request, typically communicated through inputs to the UI 13 as previously described. Additionally, a demand for output torque is predicated on external conditions, including, e.g., road grade, road surface conditions, or wind load. The operating range state may be predicated on a powertrain torque demand caused by a control module command to operate of the electrical machines in an electrical energy generating mode or in a torque generating mode. The operating range state can be determined by an optimization algorithm or routine operable to determine an optimum system efficiency based upon the operator torque request, battery state of charge, and energy efficiencies of the engine 14 and the first and second electric machines 56 and 72. The control system manages the input torques from the engine 14 and the first and second electric machines 56 and 72 based upon an outcome of the executed optimization routine, and system optimization occurs to improve fuel economy and manage battery charging. Furthermore, the operation can be determined based upon a fault in a component or system.

[0042] As mentioned above, clutch slip is an event which occurs when the load or torque transmitted through a clutch or reactive torque exceeds an actual torque capacity of the clutch. The torque applied overcomes the static frictional forces between the connective surfaces of the clutch, and the connective surfaces rotate relative to each other. One method in steady clutch operation to avoid clutch slip is to modulate the clamping force available to the clutch control mechanism, where a greater clamping force results in a greater actual torque capacity. However, increasing available clamping force, for example, by boosting pressure to a hydraulic clutch control system, has limitations. For example, in transient operation, input torques can change more quickly than hydraulic pressure can be boosted, and a large change in applied reactive torque in a short period of time can result in the torques exceeding the actual torque capacity at the existing hydraulic pressure. In a transitional clutch locking event, an unlocked clutch first undergoes a locking state, wherein clutch connective surfaces are synchronized and joined substantially without any reactive torque, clamping force is ramped up to the clutch, and reactive torque is applied in order to generate the demanded torque across the clutch. Slip in a locking event, particularly in a transmission designed for synchronous operation, adversely affects drivability by disrupting the intended output torque, therefore impacting power applied to the drivetrain. A method is disclosed whereby input torques from various sources can be limited during a transitional locking event, maintaining the reactive torque below an estimated torque capacity of the clutch, such that slip events are prevented.

[0043] FIG. 4 is a graphical representation of an exemplary transitional locking event and an associated application of reactive torque to a clutch in accordance with the present disclosure. The graph consists of two portions, synchronized by a common time scale, through a transitional locking event. The top graph depicts torque terms associated with the transitional locking event, and the bottom graph depicts clutch slip speed. As demonstrated by the high clutch slip speed and the reactive torque terms at zero, the clutch initially is in an unsynchronized state, with the engine and the electric machine or machines operating independently of the clutch. Upon command from a TCM or other control system as described above, the clutch is synchronized through a transitional locking state, and the connective surfaces within the clutch are attuned at a substantially common rotational velocity. Once synchronization is achieved, the clutch is considered to be in a locked state, however the clutch does not have any capacity to carry a reactive torque without slip. As described above, the clutch torque capacity of a clutch depends upon the clamping force applied to the clutch. Once the clutch is locked, clamping force can be increased, resulting in an increase in the clutch torque capacity. By maintaining reactive torque below the clutch torque capacity, reactive torque can be applied and increased to the clutch without causing any slip.

[0044] Because the application of the clamping force and the ability of the clutch to transfer torque without slip is time dependent, where the clutch torque capacity must be present to handle the applied torque load, managing reaction times of hybrid drive components to changes in commands is important to reducing potential for slip in transient conditions. As is known by one having ordinary skill in the art, any control system includes a reaction time. A transitional locking event, requiring controlled reactions within the clutch as an increase in clamping force and within the engine and the electric machine or machines as an increase in input torques, must balance the reaction times of these components in order to maintain the torque capacity of the clutch above the applied reactive torque, thereby avoiding slip, while executing the clutch shift command in as short of a time span as possible. Increases in torque capacity of a clutch are controlled by a commanded clutch torque from the clutch control system. Reaction time within a clutch to changes in commanded torque is impacted by a number of factors, including the particulars of the clutch design and the control method of the clutch control system. In the exemplary embodiment of the clutch control system described above, utilizing a hydraulic system to exert clamping force within the clutches, contributors to reaction time include time required to activate solenoids and valves controlling hydraulic pressures and time required for pressure changes in the hydraulic medium to propagate through connected circuits. Changes to input torque supplied from an engine are controlled by engine torque commands setting the torque output of the engine, for example, as controlled through an ECM. Reaction time within an engine to changes in commanded torque is impacted by a number of factors well known in the art, and the particulars of a change to engine operation depend heavily on the particulars of the engine employed and the mode or modes of combustion being utilized. In many circumstances, the reaction time of an engine to control commands will be the longest reaction

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
148 of 584

time of the components to the hybrid drive system. Changes to input torque supplied from an electric machine are frequently controlled by electric signals to the electric machine or machines involved in producing the torque. Reaction time within an electric machine and electric machine control circuits include time to activate any necessary switches, relays, or other controls and time to energize or deenergize the electric machine with the change in applied electrical power.

[0045] While a method can be utilized to perform the increases associated with a transitional locking event in sequence, with the torque capacity being the first parameter to be increased followed by increases in reactive torque, time involved in a locking transition is also important to drivability. Therefore, it is advantageous to perform associated increases in parallel while still acting to prevent slip. Such parallel implementation of control changes intending to effect increases associated with a transitional locking event in as short of a time-span as possible while still preventing slip must schedule command timing for the various increases while accounting for reaction times in the various hybrid drive components involved.

[0046] FIG. 4 illustrates an exemplary execution of timing considerations which can be utilized during a transitional locking event. As described above, after a TCM or another exemplary control system determines that the clutch is to be transitioned from an unlocked state to a locked state, synchronization of the clutch is first achieved, resulting in a locked state. Once the clutch is considered to be in a locked state, demand torque in the form of a clutch torque command can be transferred by a control system to the clutch. The initiation of this clutch torque command requires a series of subordinate commands necessary to transition the synchronized but unloaded clutch to a fully operational state, for instance, with fill commands in a hydraulically activated system, with the clutch transferring a reactive torque up to limits based upon physical characteristics of the clutch and associated systems. As described above, a method is disclosed whereby input torques from various sources can be limited during a transitional locking event, maintaining the reactive torque below an estimated torque capacity of the clutch, such that slip events are prevented. In relation to the initiation of commands during the transitional locking event, clutch capacity must be increased before reactive torque to the clutch can be increased. Therefore, because clutch capacity is a first prerequisite to accomplish the loading of reactive torque to the clutch, an increase in clutch capacity can commanded anticipatorily to achieve an initial increase in clutch capacity coincident with the clutch reaching a locked state. Reactive torques, taking into account reaction times, can then be timely commanded with a short lag to follow increasing clutch torque capacity. An exemplary method to command the increases to reactive torque is depicted in FIG. 4, estimated reactive torque resulted from input and electric machine torques, as limited by an clutch reactive torque immediate maximum acting as a constraint upon electric machine torque commands, is initiated after a calibrated immediate delay from the initiation of the clutch torque command and is raised at a calibrated ramp rate. The delay and ramp rate are selected values which are most likely to bring the reactive torque up to normal levels quickly while staying below the increasing estimated clutch torque capacity. However, as depicted in the exemplary data, the estimated clutch torque capacity can be compared to the clutch reactive torque immediate maximum command, and the ramped increase in the torque command can be adjusted if the estimated clutch torque capacity impinges upon the ramped increase in the reactive torque command. It should be noted in the exemplary method that the command to increase input torque through the clutch reactive torque immediate maximum is only the command to increase torque. By insuring that the reactive torque command to the electric machine lags the increasing clutch torque capacity, the reaction time of the electric machine to the reactive torque command will further delay the actual application of reactive torque, thereby preventing the occurrence of slip. As described above, the reaction time of input torque from the engine to changes in commands is frequently longer than the reaction times of other hybrid drive components. Commands to the engine must, similarly to commands to the electric machine, create increasing reactive torque to the clutch lagging the increasing clutch torque capacity. The exemplary method therefore provides commands to the engine in the form of a clutch reactive torque lead immediate maximum, with the lead calibrated to issue commands to the engine before corresponding commands are issued to the electric machine, with timing set by a calibrated lead immediate delay, and utilizing the same calibrated ramp rate as the clutch reactive torque immediate maximum, such that resulting increases in input torques from both sources increase at substantially the same time and same rate. It will be appreciated by one having ordinary skill in the art that engines and electric machines in a hybrid drive system work together to provide torque to a driveline. The input torque values from the engine and the electric machines as depicted in FIG. 4 are not additive, but rather describe the maximum values permitted of each component in supplying a portion of the total input torque. By thusly timing the clutch reactive torque immediate maximum commands of the electric machine to the initiation of the clutch torque command and corresponding known behavior of the increasing clutch torque capacity and by timing the clutch reactive torque lead immediate maximum commands of the engine to the clutch reactive torque immediate maximum, reactive torque transmitted through a clutch can be increased in parallel to an increasing clutch torque capacity while still preventing slip.

[0047] While the above described method as described in FIG. 4 depicts one method to increase reactive torques in parallel to an increasing clutch torque capacity, the method described utilizes an exemplary process. Other embodiments of this method are envisioned. For example, a method can, instead of selecting an clutch reactive torque immediate maximum command to slightly lag the estimated clutch torque capacity, alternatively select the clutch reactive torque

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
149 of 584

lead immediate command to correspond to the estimated clutch torque capacity, for instance, by leading the estimated clutch torque capacity by some small amount less than the reaction time of the engine and, if an anomalous estimated clutch torque capacity increase is diagnosed, recovering to still preventing slip. Alternatively, the clutch reactive torque clutch reactive torque lead immediate maximum and the clutch reactive torque immediate maximum can be selected and implemented to effect an increase in reactive torque lagging by some measure the increasing estimated torque capacity. Alternatively, instead of utilizing set calibrated delay and ramp values, an algorithm diagnosing or projecting clamping forces or otherwise estimating clutch torque capacity throughout a transitional locking event based upon some initial values can be utilized in real time, initiating and controlling increases in reactive torque commands based upon projections rather than through calibrated ramp and delay values. Alternatively, a plurality of calibrated ramp and delay values can be stored in a memory device or other method to store tabulated data, and values can be looked up and utilized in accordance with hybrid drive system reactions to certain properties such as temperature or maintenance history. The particular embodiments described herein in connection with the above described method are exemplary illustrations, and the disclosure is not intended to be limited in any way thereto.

[0048] FIG. 5 shows a control system architecture for controlling and managing torque and power flow in a powertrain system having multiple torque generative devices, described hereinbelow with reference to the hybrid powertrain system shown in FIGS. 1 and 2, and residing in the aforementioned control modules in the form of executable algorithms and calibrations. The control system architecture can be applied to any powertrain system having multiple torque generative devices, including, e.g., a hybrid powertrain system having a single electric machine, a hybrid powertrain system having multiple electric machines, and non-hybrid powertrain systems.

[0049] The control system architecture of FIG. 5 depicts a flow of pertinent signals through the control modules. In operation, the operator inputs to the accelerator pedal 113 and the brake pedal 112 are monitored to determine the operator torque request ('T_{O_REQ}'). Operation of the engine 14 and the transmission 10 are monitored to determine the input speed ('N_I') and the output speed ('N_O'). A strategic optimization control scheme ('Strategic Control') 310 determines a preferred input speed ('N_{I_DES}') and a preferred engine state and transmission operating range state ('Hybrid Range State Des') based upon the output speed and the operator torque request, and optimized based upon other operating parameters of the hybrid powertrain, including battery power limits and response limits of the engine 14, the transmission 10, and the first and second electric machines 56 and 72. The strategic optimization control scheme 310 is preferably executed by the HCP 5 during each 100 ms loop cycle and each 25 ms loop cycle.

[0050] The outputs of the strategic optimization control scheme 310 are used in a shift execution and engine start/stop control scheme ('Shift Execution and Engine Start/Stop') 320 to command changes in the transmission operation ('Transmission Commands') including changing the operating range state. This includes commanding execution of a change in the operating range state if the preferred operating range state is different from the present operating range state by commanding changes in application of one or more of the clutches C 1 70, C2 62, C3 73, and C4 75 and other transmission commands. The present operating range state ('Hybrid Range State Actual') and an input speed profile ('N_{I_PROF}') can be determined. The input speed profile is an estimate of an upcoming input speed and preferably comprises a scalar parametric value that is a targeted input speed for the forthcoming loop cycle. The engine operating commands and the operator torque request are based upon the input speed profile during a transition in the operating range state of the transmission.

[0051] A tactical control scheme ('Tactical Control and Operation') 330 is repeatedly executed during one of the control loop cycles to determine engine commands ('Engine Commands') for operating the engine, including a preferred input torque from the engine 14 to the transmission 10 based upon the output speed, the input speed, and the operator torque request and the present operating range state for the transmission. The engine commands also include engine states including one of an all-cylinder operating state and a cylinder deactivation operating state wherein a portion of the engine cylinders are deactivated and unfueled, and engine states including one of a fueled state and a fuel cutoff state.

[0052] A clutch torque ('T_{CL}') for each clutch is estimated in the TCM 17, including the presently applied clutches and the non-applied clutches, and a present engine input torque ('T_I') reacting with the input member 12 is determined in the ECM 23. A motor torque control scheme ('Output and Motor Torque Determination') 340 is executed to determine the preferred output torque from the powertrain ('T_{O_CMD}'), which includes motor torque commands ('T_A', 'T_B') for controlling the first and second electric machines 56 and 72 in this embodiment. The preferred output torque is based upon the estimated clutch torque(s) for each of the clutches, the present input torque from the engine 14, the present operating range state, the input speed, the operator torque request, and the input speed profile. The first and second electric machines 56 and 72 are controlled through the TPIM 19 to meet the preferred motor torque commands based upon the preferred output torque.

The motor torque control scheme 340 includes algorithmic code which is regularly executed during the 6.25 ms and 12.5 ms loop cycles to determine the preferred motor torque commands.

[0053] FIG. 6 is a schematic diagram exemplifying data flow through a shift execution, describing more detail exemplary execution of the control system architecture such as the system of FIG. 5 in greater detail, in accordance with the present disclosure. Powertrain control system 400 is illustrated comprising several hybrid drive components, including an engine

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
150 of 584

410, an electric machine 420, and clutch hydraulics 430. Control modules strategic control module 310, shift execution module 450, clutch capacity control module 460, tactical control and operation module 330, output and motor torque determination module 340, and clutch control module 490, are illustrated, processing information and issuing control commands to engine 410, electric machine 420, and clutch hydraulics 430. These control modules can be physically separate, can be grouped together in a number of different control devices, or can be entirely performed within a single physical control device. Module 310, a strategic control module, performs determinations regarding preferred powertrain operating points and preferred operating range states as described in FIG. 5. Module 450, a shift execution module, receives input from strategic control module 310 and other sources regarding shift initiation. Module 450 processes inputs regarding the reactive torque currently transmitted through the clutch and the preferred operating range state to be transitioned to. Module 450 then employs programming, determining parameters for the execution of the shift, including hybrid range state parameters describing the balance of input torques required of the torque providing devices, details regarding a target input speed and input acceleration lead predicted required to execute the transition to the preferred operating range state, an input acceleration lead immediate as previously described, and clutch reactive torque lead immediate minimum and maximum and clutch reactive torque immediate minimum and maximum values as previously described. From module 450, clutch reactive torque parameters and hybrid range state information are fed to clutch capacity control module 460, lead control parameters and signals are fed to tactical control and operation module 330, and immediate control parameters and signals are fed to output and motor torque determination module 340. Clutch capacity control module 460 processes reactive torque and hybrid range state information and generates logic describing clutch reactive torque limits enabling engine control through module 330, electric machine control through module 340, and clutch control through module 490, in accordance with methods described herein. Tactical control and operation module 330 includes means to issue torque requests and execute limits upon input torque supplied from engine 410, and feed, additionally, describe the input torque supplied from the engine to module 340 for use in control of electric machine 420. Output and motor torque determination module 340 likewise receives and processes information to issue electric machine torque requests to electric machine 420. Additionally, module 340 generates clutch reactive torque commands for use by clutch control module 490. Module 490 processes information from modules 460 and 340 and issues hydraulic commands in order to achieve the required clutch torque capacity required to operate the transmission. This particular embodiment of data flow illustrates one possible exemplary process by which a vehicular torque generative devices and related clutches can be controlled in accordance with the method disclosed herein. It will be appreciated by one having ordinary skill in the art that the particular process employed can vary, and this disclosure is not intended to limited to the particular exemplary embodiment described herein.

[0054] FIG. **7** is a flowchart demonstrating an exemplary process whereby limits may be imposed upon an engine and electric machine through a transitional locking event in order to prevent slip in accordance with the present disclosure. Through process 200, as illustrated, a clutch reactive torque lead immediate maximum and a clutch reactive torque immediate maximum are defined and ramped up after respective delay periods. The process is iterative and runs in multiple cycles in order to initiate and ramp up reactive torque for the subject clutch. At step 202, the process begins. At step 204, the state of the clutch is checked to see if the clutch is locked. As described above, it is preferred to synchronize the clutch before applying clamping force in order to initiate the ramping up of clutch torque capacity and the reactive torque. If the clutch is not locked, then the process proceeds to end at step 230. If the clutch is locked, then the process proceeds to step 206. At step 206, the status of the process is checked, and if this iteration of process 200 is the first iteration since the clutch reached a locked state, then the process proceeds to step 208, wherein a lead immediate delay timer and an immediate delay timer are reset. Either from step 206 or step 208, the process proceeds to step 210. As described above, an lead immediate delay is utilized to time the initiation of the ramping up of the clutch reactive torque lead immediate maximum. Step 210 evaluates, based upon the timers reset in step 208, whether the lead immediate delay has expired. If the timer indicating the delay period has expired, then the process proceeds to step 214. If the timer indicating the delay period has not expired, then the process proceeds to step 212. At step 212, with the process still in the lead immediate delay period, the clutch reactive torque lead immediate maximum is set to zero, and the process proceeds to step 220. In the alternative, at step 214, the clutch reactive torque lead immediate maximum is incrementally increased at a calibrated ramp rate and the process proceeds to step 216. At step 216, the clutch reactive torque lead immediate maximum, increased at step 214, is compared to a calculated or estimated achievable torque capacity, designating the maximum torque capacity that can be commanded by the clutch control system, including any boost capacity available to increase clamping force within the clutch. If the clutch reactive torque lead immediate maximum is determined to be in excess of the achievable capacity of the clutch, then, at step 218, the clutch reactive torque lead immediate maximum is set to the achievable capacity of the clutch. Either from step 212, 216, or 218, the process proceeds to step 220. As described above, an immediate delay is utilized to time the initiation of the ramping up of the clutch reactive torque immediate maximum. Step 220 evaluates, based upon the timers reset in step 208, whether the immediate delay has expired. If the timer indicating the delay period has expired, then the process proceeds to step 224. If the timer indicating the delay period has not expired, then the process proceeds to step 222. At step 222, with the process still in the immediate delay period, the clutch reactive torque immediate maximum is set

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
151 of 584

to zero, and the process proceeds to step 230. In the alternative, at step 224, the clutch reactive torque immediate maximum is incrementally increased at the same calibrated ramp rate utilized in step 214 and the process proceeds to step 226. At step 226, the clutch reactive torque immediate maximum, increased at step 224, is compared to a calculated or estimated torque capacity based upon current operational capacities. If the clutch reactive torque immediate maximum is determined to be in excess of the current estimated capacity of the clutch, then, at step 228, the clutch reactive torque immediate maximum is set to the estimated capacity of the clutch. Either from step 222, 226, or 228, the process proceeds to end at step 230. As aforementioned, process 200 reiterates in order to incrementally effect changes to the reactive torque commands. One having ordinary skill in the art will appreciate that the process may reiterate independently or as part of a broader control cycle.

[0055] The above method describes a process for transitioning a single clutch from an unlocked state to a locked state, carrying a reactive torque. Related methods are envisioned, wherein a plurality of clutches can be substantially simultaneously transitioned, wherein all of the clutch torque capacities are coordinated with various input torques to prevent slip, for instance, if a vehicle transitioned from one extreme setting to another. Multiple clutches, previously carrying zero or low reactive torque loads, can simultaneously be in transition to carrying high or maximum reactive torque loads. In such an exemplary application of the above method, different clutches can face potential slip in different ranges of the reactive torque increase. For example, a first clutch may need input torques constrained in a low torque range, while a second clutch may need input torques constrained in a higher range. A method is envisioned, in accordance with this example, wherein a calibrated ramp rate and associated delay periods can be implemented in conjunction with the first clutch, and at a threshold torque or when estimated clutch torque capacity of the second clutch impinges upon the increasing reactive torque commands, a second calibrated ramp rate corresponding to the second clutch can be utilized. Such a method can be utilized to coordinate increasing reactive torque commands and estimated clutch torque capacitys simultaneously across a plurality of clutches.

[0056] The above method and FIG. 4 describe torque management processes as a comparison of positive values. It will be appreciated by one having ordinary skill in the art that clutch torques are described as positive and negative torques, signifying torques applied in one rotational direction or the other. The above method can be used in either positive or negative torque applications, where the magnitudes of the torques are modulated in such a way that the magnitude of the applied reactive torque does not exceed the magnitude of the torque capacity for a particular clutch.

[0057] It is understood that modifications are allowable within the scope of the disclosure. The disclosure has been described with specific reference to the preferred embodiments and modifications thereto. Further modifications and alterations may occur to others upon reading and understanding the specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the disclosure.

Claims

1. Method for controlling a powertrain comprising an electro-mechanical transmission mechanically-operatively coupled to an internal combustion engine and an electric machine adapted to selectively transmit mechanical power to an output member through selective application of a plurality of torque-transfer clutches, the method comprising:

   monitoring a clutch slip speed;
   synchronizing an oncoming clutch; and
   constraining reactive clutch torque limits for said oncoming clutch to achieve a reactive clutch torque that is less than an estimated clutch torque capacity.

2. The method of claim 1, wherein constraining reactive clutch torque limits comprises:

   imposing an clutch reactive torque immediate maximum upon an electric machine torque command, wherein said imposing said clutch reactive torque immediate maximum maintaining said electric machine torque command less than said estimated clutch capacity; and
   imposing a clutch reactive torque lead immediate maximum upon an engine torque command, wherein said imposing said clutch reactive torque lead immediate maximum is based upon effecting substantially same said reactive torque limits as said imposing said clutch reactive torque immediate maximum.

3. The method of claim 2, wherein imposing said clutch reactive torque immediate maximum upon an electric machine torque command comprises:

   imposing upon said electric machine torque command an immediate delay and a calibrated ramp rate, wherein said immediate delay and said calibrated ramp rate are calculated to effect said maintaining said electric machine

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
152 of 584

torque command less than said estimated clutch capacity;
wherein said imposing said clutch reactive torque immediate maximum upon an electric machine torque command comprises imposing upon said electric machine torque command a lead immediate delay and said calibrated ramp rate, wherein said lead immediate delay is calculated based upon an estimated engine command reaction time and an estimated electric machine command reaction time and creates said effecting substantially same said reactive torque limits as said imposing said clutch reactive torque immediate maximum.

4. The method of claim 1, wherein constraining reactive clutch torque limits for the oncoming clutch comprises:

calculating said estimate clutch torque capacity;
projecting a clutch torque capacity curve based upon said estimated clutch torque capacity; and
effecting said constraining reactive clutch torque limits based upon said projecting and based upon an estimated engine command reaction time and an estimated electric machine command reaction time.

5. Method for controlling through a transitional locking event a powertrain comprising an electro-mechanical transmission comprising a selectively activated torque-transfer clutch mechanically-operatively coupled to an internal combustion engine and an electric machine adapted to selectively transmit mechanical power to an output member, the method comprising:

monitoring a clutch slip speed through a clutch synchronizing event; diagnosing a locked clutch state based upon said monitoring;
upon said diagnosing said locked clutch state, increasing a clutch torque capacity;
upon running a calibrated lead immediate delay after said diagnosing said locked clutch state, increasing a clutch reactive torque lead immediate maximum command at a controlled ramp rate; and
upon running a calibrated immediate delay after said diagnosing said locked clutch state, increasing an clutch reactive torque immediate maximum command at said controlled ramp rate;
wherein said increasing said clutch reactive torque lead immediate maximum command and said increasing said clutch reactive torque immediate maximum command effect a reactive torque lower than said increasing clutch torque capacity throughout said transitional locking event.

6. The method of claim 5, wherein running said calibrated immediate delay and said increasing said clutch reactive torque immediate maximum command at said controlled ramp rate effect said clutch reactive torque immediate maximum command closely lagging said increasing clutch torque capacity.

7. The method of claim 6, wherein running said calibrated lead immediate delay effects said clutch reactive torque lead immediate maximum command such that an input torque from said engine initially increases substantially coincidently with an input torque from said electric machine.

8. The method of claim 5, further comprising:

estimating said clutch torque capacity;
projecting a clutch torque capacity curve for the remainder of said transitional locking event; and
modulating said controlled ramp rate based upon said estimating.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
153 of 584

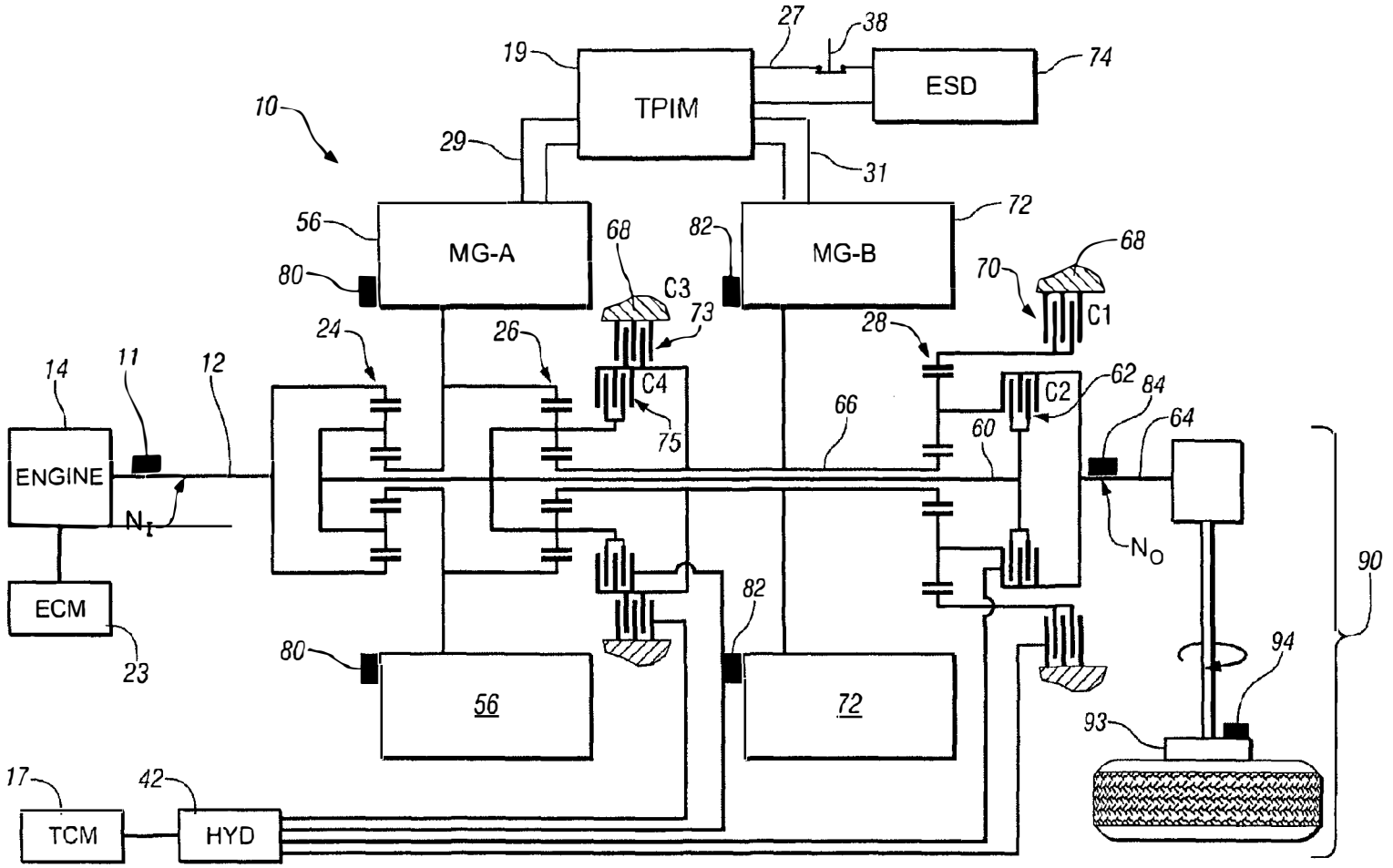

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C1
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C4
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C2
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FIG. 1

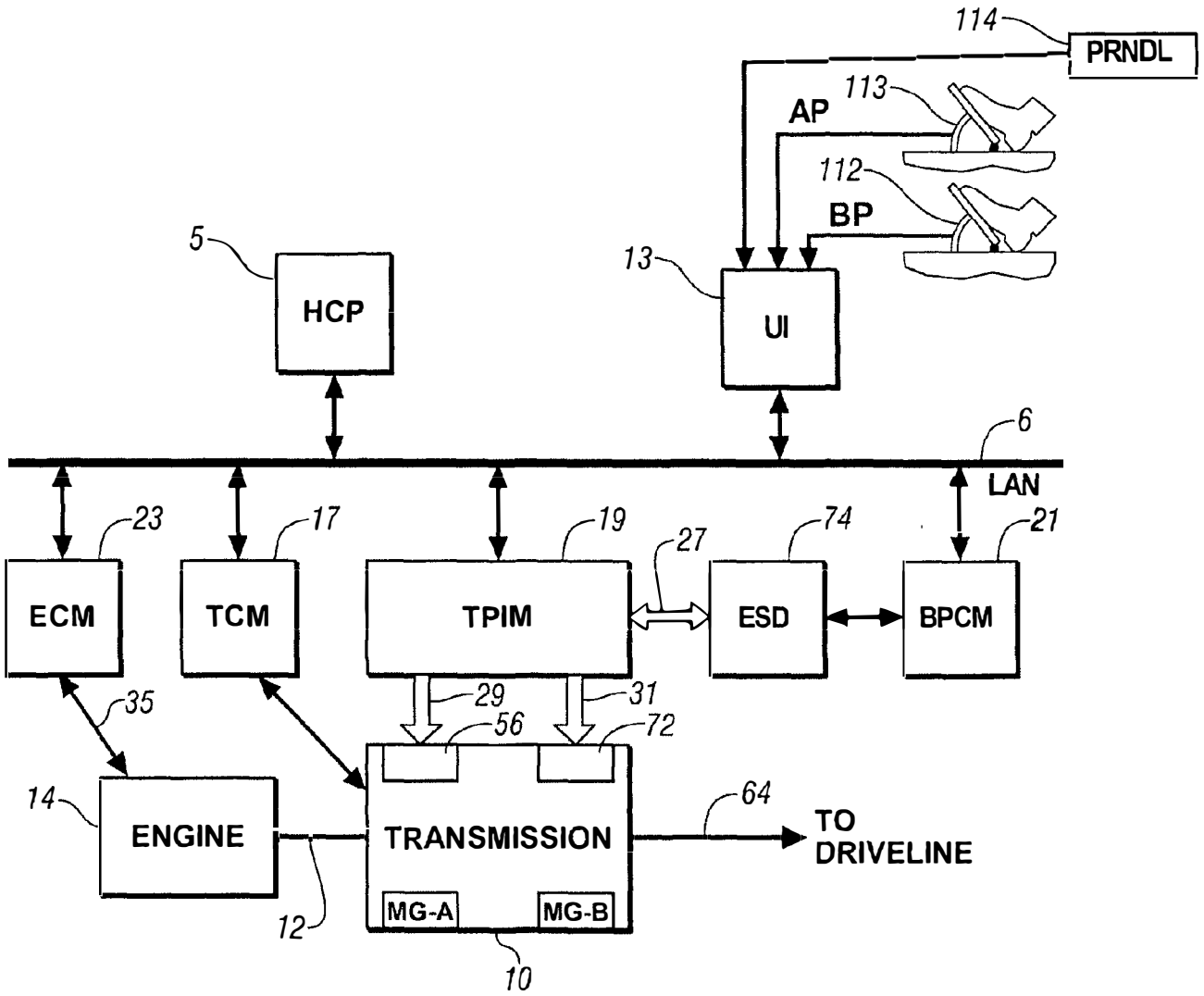

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ESD
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FIG. 2

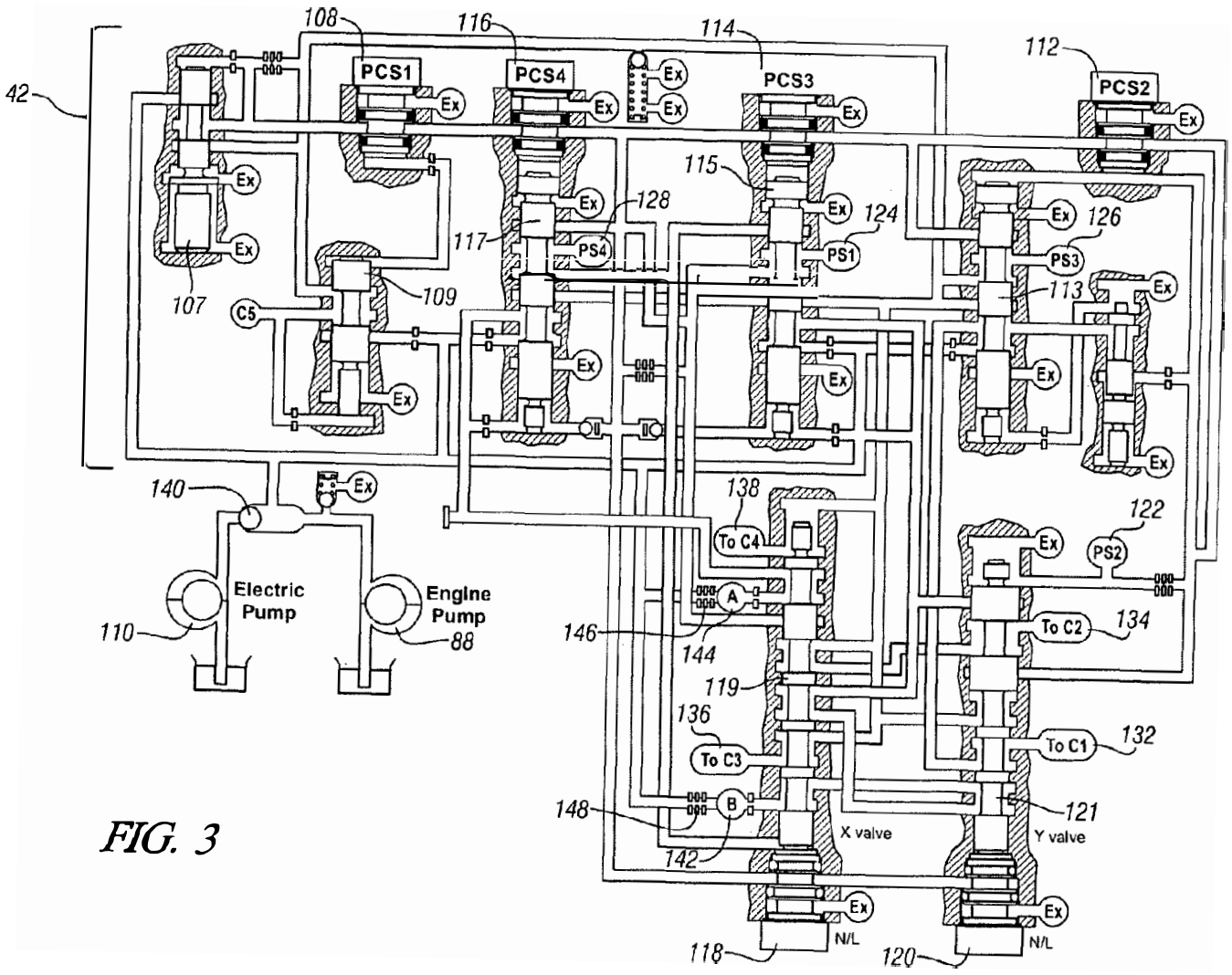

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To C4
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PS2
Electric Pump
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A
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FIG. 3

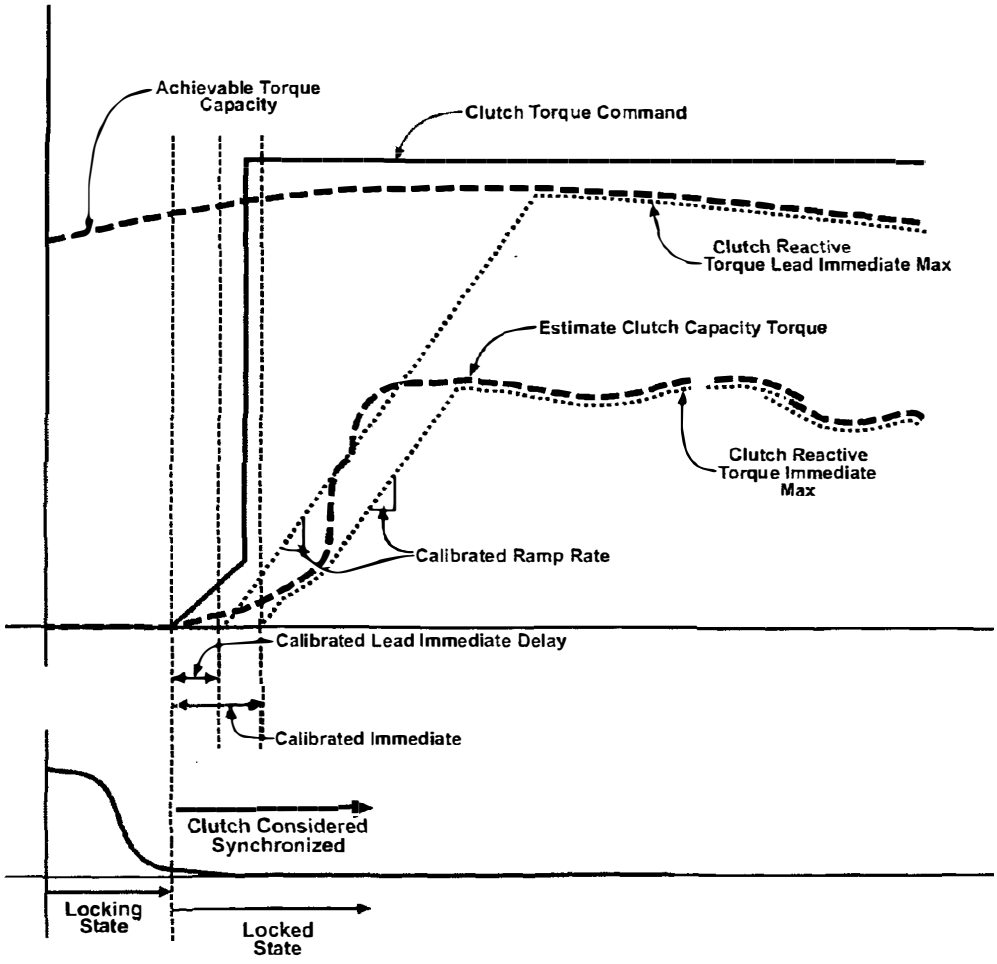


FIG. 4

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
157 of 584

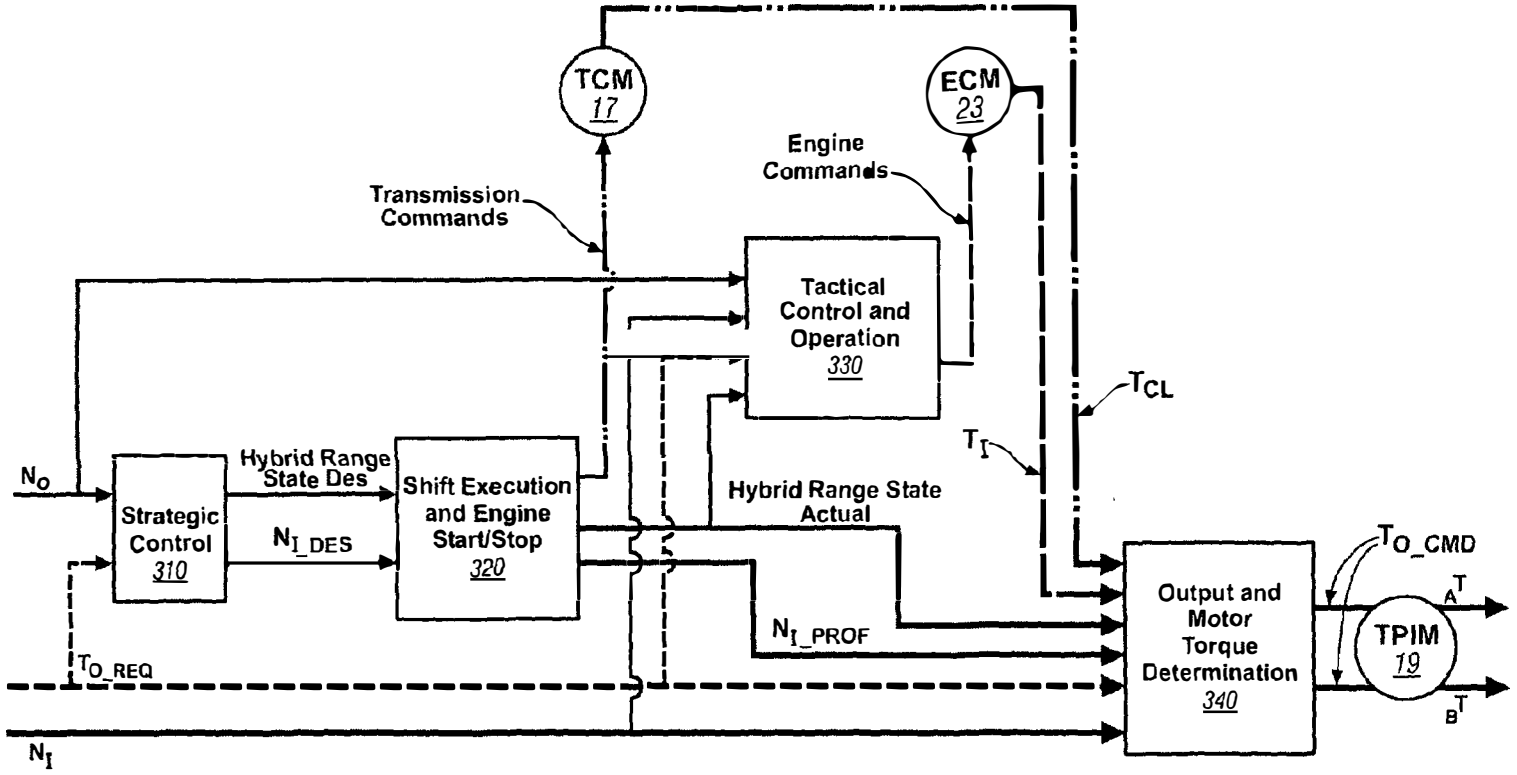

TCM
17
ECM
23
Engine
Commands
Transmission
Commands
Tactical
Control and
Operation
330
T_{CL}
T_I
N_O
Strategic
Control
310
Hybrid Range
State Des
N_{I_DES}
Shift Execution
and Engine
Start/Stop
320
Hybrid Range State
Actual
N_{I_PROF}
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FIG. 5

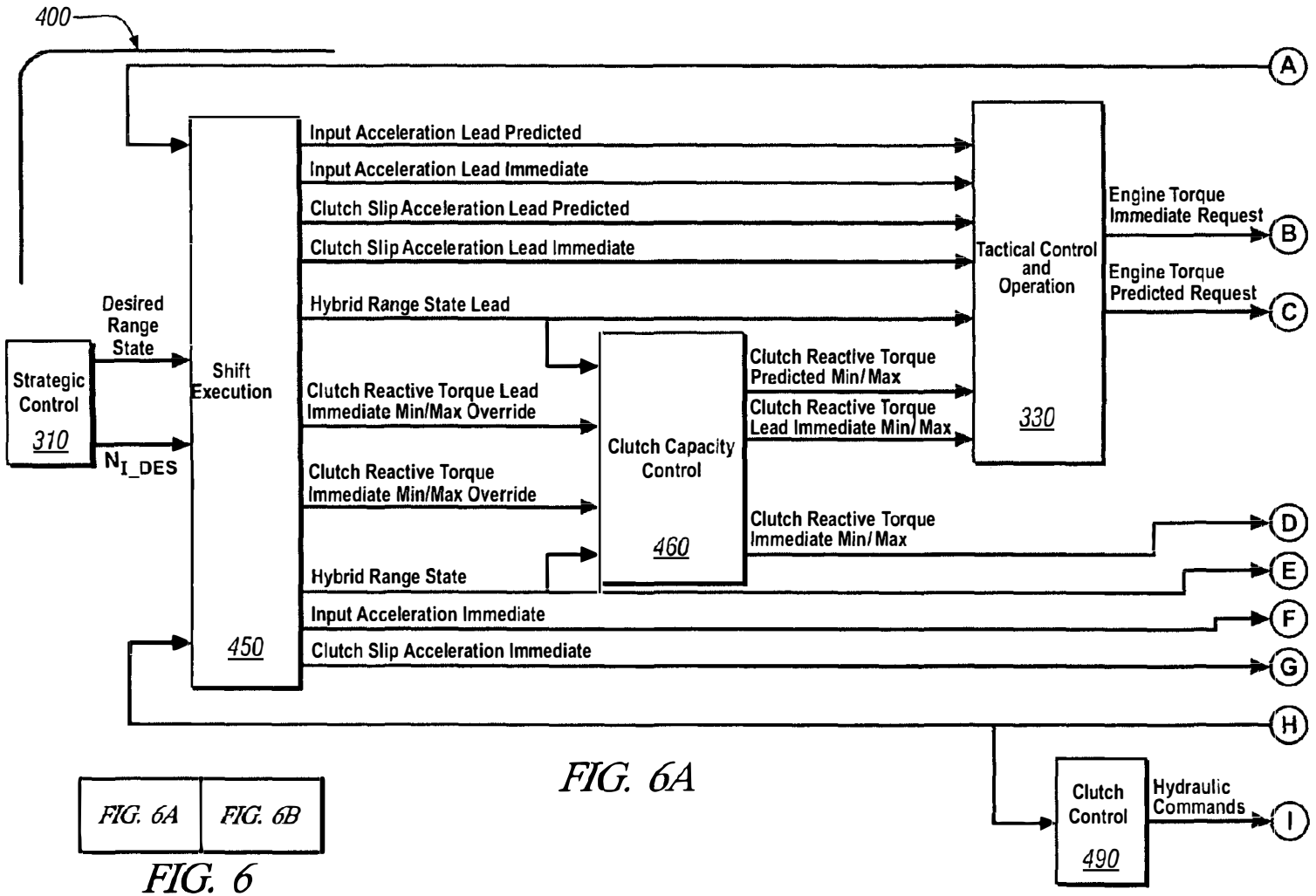


FIG. 6A

FIG. 6A | FIG. 6B

FIG. 6

EP 2 055 549 A2

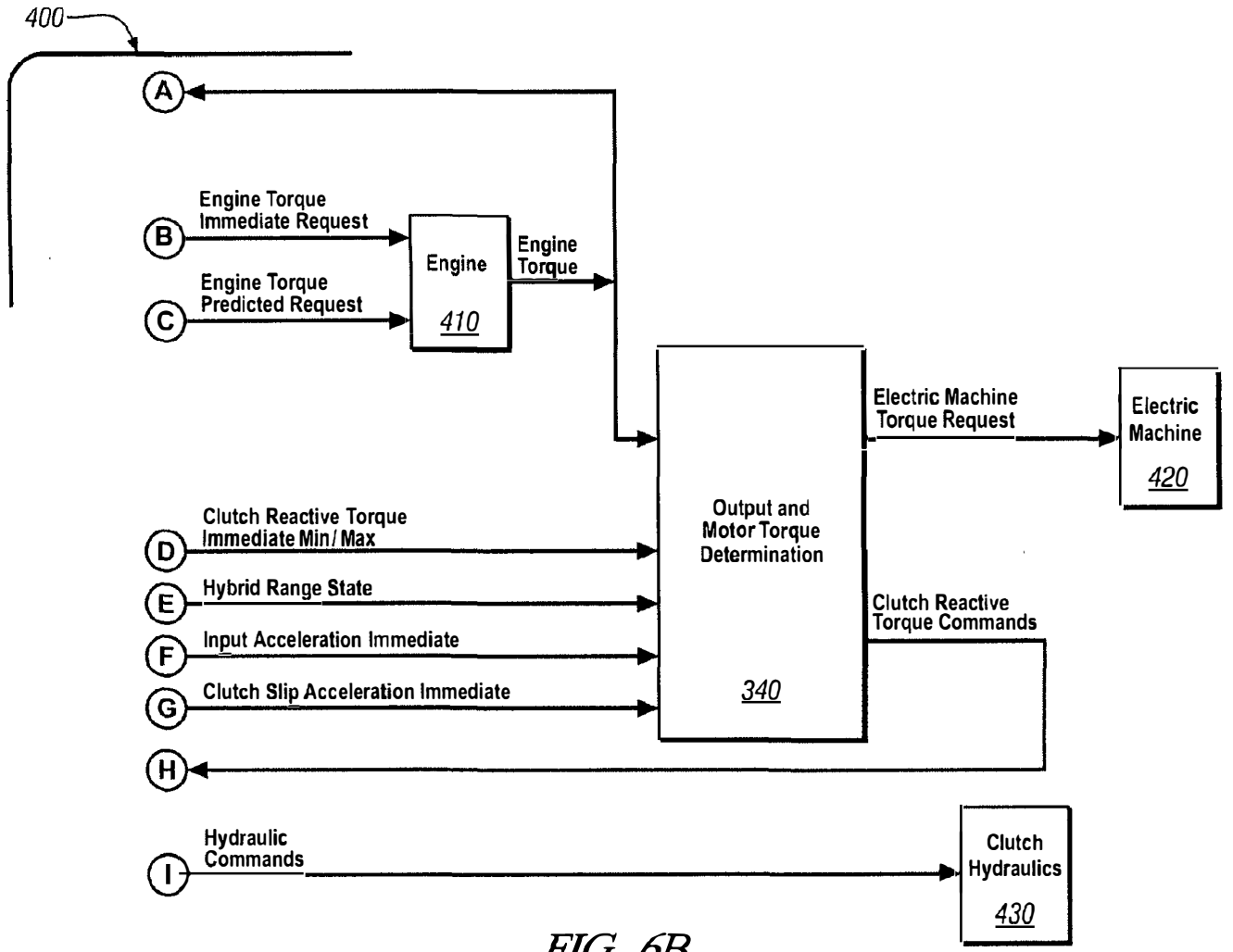

400
A
Engine Torque Immediate Request
B
Engine Torque Predicted Request
C
Engine
410
Engine Torque
Output and Motor Torque Determination
340
Electric Machine Torque Request
Electric Machine
420
Clutch Reactive Torque Immediate Min/Max
D
Hybrid Range State
E
Input Acceleration Immediate
F
Clutch Slip Acceleration Immediate
G
Clutch Reactive Torque Commands
H
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I
Clutch Hydraulics
430

FIG. 6B

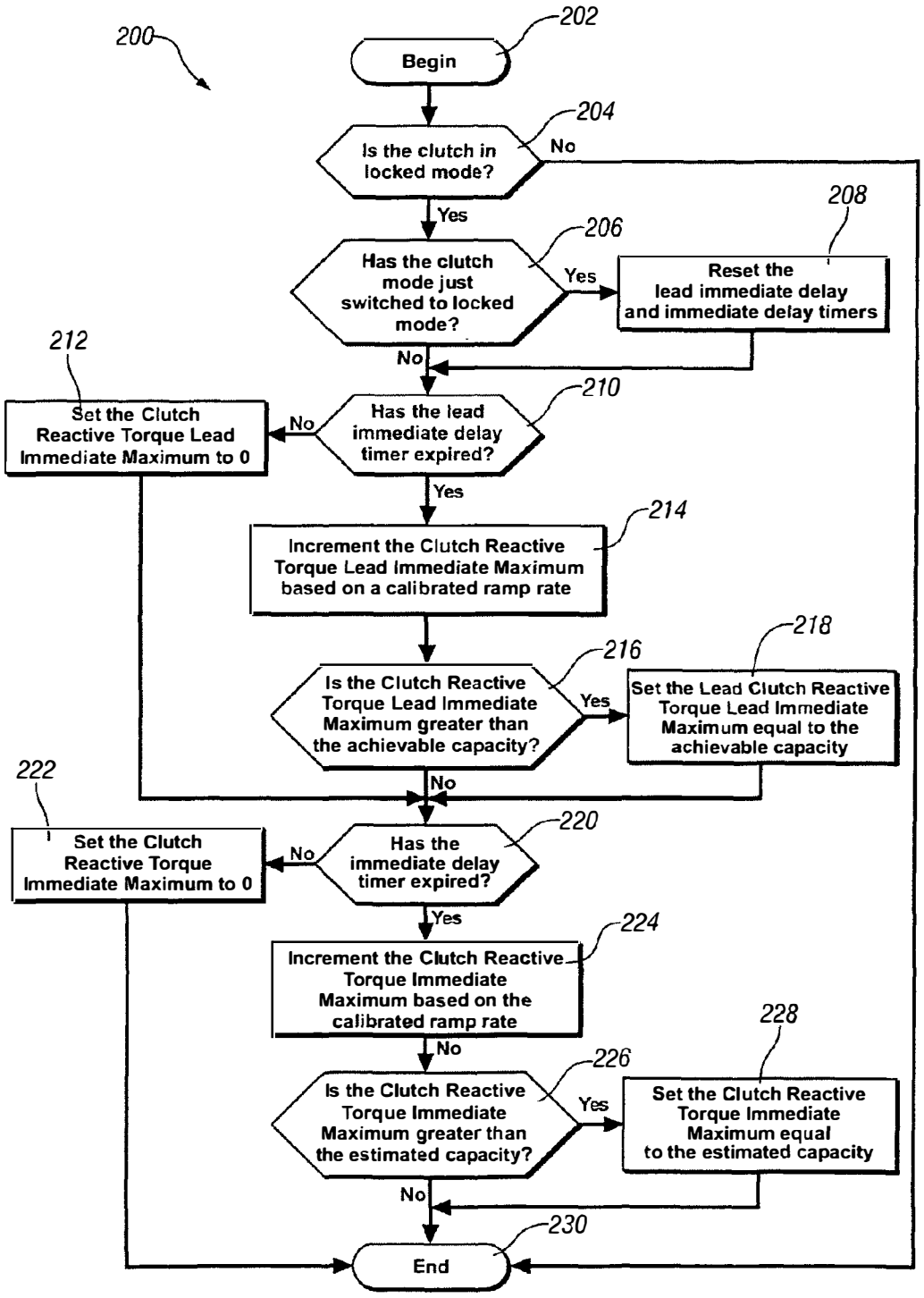


FIG. 7

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
161 of 584

REFERENCES CITED IN THE DESCRIPTION

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Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
162 of 584

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(54) Hybrid power train having epicyclic type clutch device

(57) The invention relates to a hybrid power train comprising an engine (ICE 100) and at least one electric machine (EM102) linked to each other using an epicyclic gearing (EG101) and a brake (BK101). The aim is to replace a conventional friction clutch.

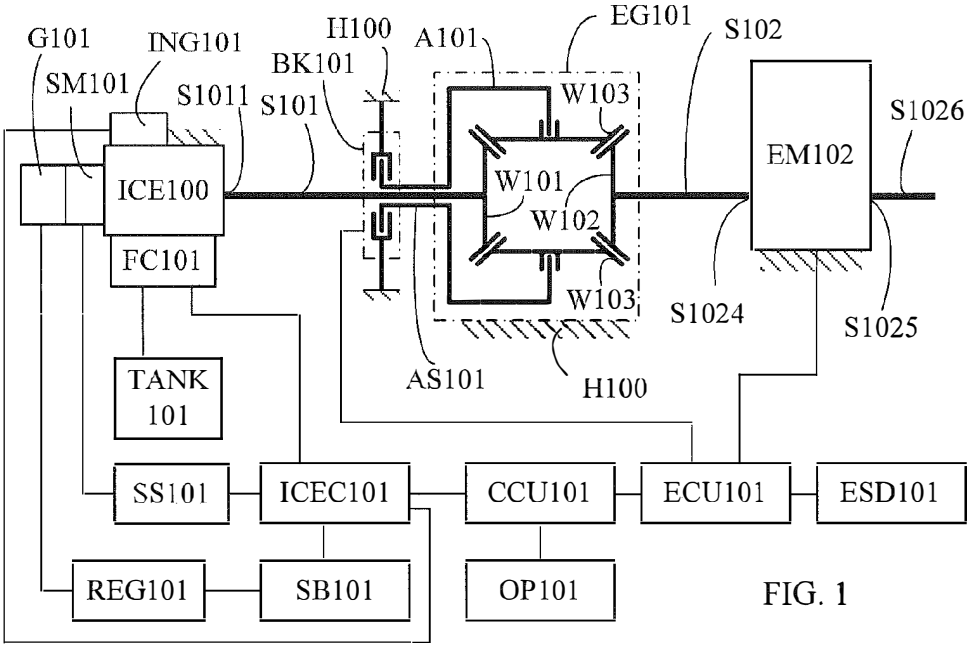


FIG. 1

EP 2 497 666 A2

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Description

BACKGROUND OF THE INVENTION

(a) Field of the Invention

[0001] The present invention is through an epicyclic gear set and a controllable brake device to structure the clutch function, so as to replace the conventional friction type electromagnetic clutch device, and combined with two or more than two of one or more rotary kinetic power device to constitute a hybrid power train having epicyclic type clutch device.

(b) Description of the Prior Art

[0002] A friction type electromagnetic clutch device is often installed between conventional automatic or semi-automatic power trains or hybrid power trains for performing engagement or disengagement, so that the power train is enabled to perform various functional operations; however, when the friction type electromagnetic clutch device is in a disengaged state, residual torque may remain, and thereby to cause power loss and system malfunction.

SUMMARY OF THE INVENTION

[0003] The present invention provides a hybrid power train having epicyclic type clutch device, in which the controllable brake device is used to control the power train having the epicyclic gear set serving as a clutch device, which can be widely applied in a hybrid power train with dual rotary kinetic power devices composed of an engine (ICE100) and a rotational electric machine mainly served as motor function (EM102), or a hybrid power train with triple rotary kinetic power sources composed of an engine (ICE100) and a rotational electric machine mainly served as power generator function (EM101) and a rotational electric machine mainly served as motor function (EM 102), wherein the structural configuration of each rotary kinetic power device combining with a transmission device includes a coaxial in-series structure or a multiple axial in-parallel structure for satisfying the requirement of applied space.

[0004] According to one aspect of the present invention, a hybrid power train includes an epicyclic type clutch device, the epicyclic type clutch device comprising an epicyclic gearset with an input wheel connected to an input shaft and an output wheel connected to an output shaft, an epicyclic wheel between the input wheel and the output wheel and a rocker arm rotatable around the same axis as the input shaft and/or the output shaft, the epicyclic type clutch device further comprising a brake device arranged to prevent rotation of the rocker arm, the input shaft or the output shaft; the hybrid power train further comprising an engine and a rotational electric machine which are directly or indirectly connected through the epicyclic type clutch device.

[0005] A second rotational electric machine may be located positioned between the engine and the epicyclic type clutch device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIG.1 is a schematic structural view showing a rocker arm (A101) and a sleeve type rotation shaft (AS101) driven by an engine (ICE 100) and an epicyclic wheel (W 103) of an epicyclic gear set (EG101) being combined with a controllable brake device (BK101), and an input wheel (W102) of the epicyclic gear set (EG101) and an output/input end of a rotation shaft (S102) being combined with a rotational electric machine mainly served as motor function (EM102) and an output/input end rotation shaft (S1026), according to one embodiment of the present invention.

FIG. 2 is a schematic view showing the structure shown in FIG. 1 wherein a first transmission device (T1) being installed between the engine (ICE100) and the controllable brake device (BK101), and the input wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) being combined with the rotational electric machine mainly served as motor function (EM102) and the output/input end rotation shaft (S1026), according to one embodiment of the present invention.

FIG. 3 is a schematic view showing the rotational electric machine mainly served as power generator function (EM101) being installed between the engine (ICE 100) and the controllable brake device (BK101) shown in FIG. 1, according to one embodiment of the present invention.

FIG. 4 is a schematic view showing the rotational electric machine mainly served as power generator function (EM101) being installed between the first transmission device (T1) and the controllable brake device (BK101) shown in FIG. 2, according to one embodiment of the present invention.

FIG. 5 is a schematic structural view showing the present invention being structured by the engine (ICE100) and a transmission unit (T200) and the epicyclic gear set (EG101) and a controllable brake device (BK102), the output wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) being combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) being provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being used to drive the input end of the transmission unit (T200), and the output end of the transmission unit (T200) being installed with a rotation shaft (S110), according to one embodiment of

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
164 of 584

the present invention.

FIG. 6 is a schematic view showing the structure in FIG. 5 in which the input wheel (W101) of the epicyclic gear set (EG101) being combined with the rotation shaft (S101) and combined with the rotation shaft (S1011) of the engine (ICE100), the rotation shaft (S101) being combined to an action side of a controllable brake device (BK103), and the other action end of the controllable brake device (BK103) being fixed in the housing (H100), the output/input end of the rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) being combined with a rocker arm (A111) of a planetary gear set (T300), an outer annular wheel (W113) of the planetary gear set (T300) being fixed in the housing (H100), a sun wheel (W111) of the planetary gear set (T300) being combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) being provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being provided for driving the input end of the transmission unit (T200), according to one embodiment of the present invention.

FIG. 7 is a schematic view showing the rotational electric machine mainly served as motor function (EM102) shown in FIG. 5 being installed at one end of the output/input end rotation shaft (S110) of the transmission unit (T200).

FIG. 8 is a schematic view showing the structure shown in FIG. 7 in which an epicyclic gear set (EG201) and a controllable brake device (BK104) being installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102).

FIG. 9 is a schematic view showing the structure shown in FIG. 7 in which the rotational electric machine mainly served as power generator function (EM101) being installed between the engine (ICE100) and the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101).

FIG. 10 is a schematic view showing the structure shown in FIG. 9 in which the epicyclic gear set (EG201) and the controllable brake device (BK104) being installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102).

DESCRIPTION OF MAIN COMPONENT SYMBOLS

[0007]

A101 , A111 , A201 : Rocker arm
AS101 , AS201 : Sleeve type rotation shaft
BK101 , BK102 , BK103 , BK104 : Controllable brake device
CCU101 : Central control unit
ECU101 : Drive electric circuit unit
EG101 , EG201 : Epicyclic gear set
EM101 : Rotational electric machine mainly served as power generator function
EM102 : Rotational electric machine mainly served as motor function
ESD101 : Electricity storage device
FC101 : Fuel control device
G101 : Power generator
H100 : Housing
ICE100 : Engine
ICEC101 : Engine operation control device
ING101 : Ignition device
OP101 : Operation interface
REG101 : Regulation device
S101 , S102 , S110 , S201 , S202 , S1011 , S1012 , S1013 , S1024 , S1025 , S1026 , S1031 , S1032 , S1051 , S1052 : Rotation shaft
SB101 : Start battery
SM101 : Start motor
SS101 : Start switch
T1 : First transmission device
T200 : Transmission unit
T300 : Planetary gear set
TANK101 : Fuel tank
W101 , W201 : Input wheel
W102 , W202 : Output wheel
W103 , W203 : Epicyclic wheel
Will : Sun wheel
W112 : Planetary wheel
W113 : Outer annular wheel

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] A friction type electromagnetic clutch device is often installed between conventional automatic or semi-automatic power trains or hybrid power trains for performing engagement or disengagement, so that the power train is enabled to perform various functional operations; however, when the friction type electromagnetic clutch device is in a disengaged state, residual torque may remain, and thereby to cause power loss and system malfunction.

[0009] The present invention is through an epicyclic gear set and a controllable brake device to structure the clutch function, so as to replace the conventional friction type electromagnetic clutch device, and combined with two or more than two of one or more rotary kinetic power device to constitute a hybrid power train having epicyclic type clutch device.

[0010] The present invention provides a hybrid power train having epicyclic type clutch device, in which the controllable brake device is used to control the power train having the epicyclic gear set serving as a clutch device,

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
165 of 584

which can be widely applied in a hybrid power train with dual rotary kinetic power devices composed of an engine (ICE100) and a rotational electric machine mainly served as motor function (EM102), or a hybrid power train with triple rotary kinetic power sources composed of an engine (ICE100) and a rotational electric machine mainly served as power generator function (EM101) and a rotational electric machine mainly served as motor function (EM102), wherein the structural configuration of each rotary kinetic power device combining with a transmission device includes a coaxial in-series structure or a multiple axial in-parallel structure for satisfying the requirement of applied space.

[0011] The structures and embodiments of the hybrid power train having epicyclic type clutch device are as followings:

[0012] FIG.1 is a schematic structural view showing a rocker arm (A101) and a sleeve type rotation shaft (AS101) driven by an engine (ICE100) and an epicyclic wheel (W103) of an epicyclic gear set (EG101) being combined with a controllable brake device (BK101), and an input wheel (W102) of the epicyclic gear set (EG101) and an output/input end of a rotation shaft (S102) being combined with a rotational electric machine mainly served as motor function (EM102) and an output/input end rotation shaft (S1026), according to one embodiment of the present invention.

[0013] As shown in FIG. 1, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--One end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the other end of the rotation shaft (S101) is combined with an output/input end rotation shaft (S1011) of the engine (ICE 100), and the rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is served as an output/input end for being combined with an output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), the other output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102) is combined with a rotation shaft (S1026) for being served as an output/input end;

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026);

[0014] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101)

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
166 of 584

to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0015] FIG. 2 is a schematic view showing the structure shown in FIG. 1 wherein a first transmission device (T1) being installed between the engine (ICE100) and the controllable brake device (BK101), and the input wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) being combined with the rotational electric machine mainly served as motor function (EM102) and the output/input end rotation shaft (S1026), according to one embodiment of the present invention.

[0016] As shown in FIG. 2, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
167 of 584

controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--First transmission device (T1): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1012) of the first transmission device (T1), and the output/input end rotation shaft (S1013) at the other end of the first transmission device (T1) is combined with the output/input end rotation shaft (S1011) of the engine (ICE 100);

--The rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026);

[0017] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE 100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
168 of 584

(EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM 102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU 101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0018] FIG. 3 is a schematic view showing the rotational electric machine mainly served as power generator function (EM101) being installed between the engine (ICE100) and the controllable brake device (BK101) shown in FIG. 1, according to one embodiment of the present invention.

[0019] As shown in FIG. 3, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function from the inputting rotary mechanical kinetic energy, and also having the motor function for converting the input electric power into mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined to the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101);

--The rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026) for serving as the output/input end;

--The output/input end rotation shaft (S1011) of the engine (ICE100) is combined with the output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101) is combined with the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
169 of 584

be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

[0020] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0021] FIG. 4 is a schematic view showing the rotational electric machine mainly served as power generator function (EM101) being installed between the first transmission device (T1) and the controllable brake device (BK101) shown in FIG. 2, according to one embodiment of the present invention.

[0022] As shown in FIG. 4, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
170 of 584

kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function from the inputting rotary mechanical kinetic energy, and also having the motor function for converting the input electric power into mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--First transmission device (T1): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined to the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1012) of the first transmission device (T1), and the other output/input end rotation shaft (S1013) of the first transmission device (T1) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100);

--The rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026) for serving as the output/input end;

--The output/input end rotation shaft (S1011) of the engine (ICE100) is combined with the output/input end rotation shaft (S1013) of the first transmission device (T1), the other output/input end rotation shaft (S1012) of the first transmission device (T1) is combined with the output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101) is combined with rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
171 of 584

[0023] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0024] FIG. 5 is a schematic structural view showing the present invention being structured by the engine (ICE100) and a transmission unit (T200) and the epicyclic gear set (EG101) and a controllable brake device (BK102), the output wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) being combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) being provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being used to drive the input end of the transmission unit (T200), and the output end of the transmission unit (T200) being installed with a rotation shaft (S110), according to one embodiment of the present invention.

[0025] As shown in FIG. 5, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
172 of 584

function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);
--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);
--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;
--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE 100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the controllable brake device (BK102) and combined with the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);
--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110);

[0026] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
173 of 584

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0027] FIG. 6 is a schematic view showing the structure in FIG. 5 in which the input wheel (W101) of the epicyclic gear set (EG101) being combined with the rotation shaft (S101) and combined with the rotation shaft (S1011) of the engine (ICE100), the rotation shaft (S101) being combined to an action side of a controllable brake device (BK103), and the other action end of the controllable brake device (BK103) being fixed in the housing (H100), the output/input end of the rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) being combined with a rocker arm (A111) of a planetary gear set (T300), an outer annular wheel (W113) of the planetary gear set (T300) being fixed in the housing (H100), a sun wheel (W111) of the planetary gear set (T300) being combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) being provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being provided for driving the input end of the transmission unit (T200), according to one embodiment of the present invention.

[0028] As shown in FIG. 6, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a plan-

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
174 of 584

etary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

-- Planetary gear set (T300): which is constituted by a sun wheel (W111), a planetary wheel (W112), an outer annular wheel (W113) composed of friction wheels or gears, and a shell fixed in the housing (H100), wherein the outer annular wheel (W113) is fixed in the shell then fixed in the housing or directly fixed in the housing, the planetary wheel (W112) is combined with the rocker arm (A111) and connected to the rotation shaft (S102), and the sun wheel (W111) is connected to the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102);

--The output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG 101) is combined to an action side of the controllable brake device (BK102), the other action side of the controllable brake device (BK102) is fixed in the housing (H100), and the other end of the rotation shaft (S102) is connected to the rocker arm (A111) driven by the planetary wheel (W112) of the planetary gear set (T300);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is connected to the rocker arm (A101) and connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101) and drives the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the rotation shaft (S110);

--The output/input end rotation shaft (S1011) of the engine (ICE100) is connected to the rotation shaft (S101), the rotation shaft (S101) is connected to the input wheel (W101) of the epicyclic gear set (EG101), as well as connected to an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK103) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) is enabled to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S102) and the sleeve type rotation shaft (AS101), one or both of the engine (ICE 100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive the rotation shaft (S110).

[0029] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE 100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electron-

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
175 of 584

ic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0030] FIG. 7 is a schematic view showing the rotational electric machine mainly served as motor function (EM102) shown in FIG. 5 being installed at one end of the output/input end rotation shaft (S110) of the transmission unit (T200).

[0031] As shown in FIG. 7, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG 101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the other end of the rotation shaft (S110) is served as an output/input end;

--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
176 of 584

the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110).

[0032] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0033] FIG. 8 is a schematic view showing the structure shown in FIG. **7** in which an epicyclic gear set (EG201) and a controllable brake device (BK104) being installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102).

[0034] As shown in FIG. 8, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
177 of 584

by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Epicyclic gear set (EG201): which is constituted by an input wheel (W201) and an output wheel (W202) and at least an epicyclic wheel (W203), and including through bevel gears engaging with each other, or through bevel friction wheel mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S201), the rotation shaft (S202), the rocker arm (A201), the sleeve type rotation shaft (AS201) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

-- Controllable brake device (BK104): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS201) or the rocker arm (A201), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S202) combined with the output wheel (W202) of the epicyclic gear set (EG201), the other output/input end rotation shaft (S201) combined with the input wheel (W201) of the epicyclic gear set (EG201) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W203) of the epicyclic gear set (EG201) is provided for driving the rocker arm (A201) and the sleeve type rotation shaft (AS201), the sleeve type rotate shaft (AS201) rotates on the rotation shaft (S201) and is provided for connecting to an action side of the controllable brake device (BK104), the other action side of the controllable brake device (BK104) is fixed in the housing (H100), and the other end of the rotation shaft (S110) is served as an output/input end;

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK104) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) is enabled to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S201) and the rotation shaft (S202), one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive the rotation shaft (S110).

[0035] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
178 of 584

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0036] FIG. 9 is a schematic view showing the structure shown in FIG. 7 in which the rotational electric machine mainly served as power generator function (EM101) being installed between the engine (ICE100) and the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101).

[0037] As shown in FIG. 9, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function for inputting the rotary mechanical kinetic energy, as well as having the motor function for converting the input electric power into the mechanical rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
179 of 584

(A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), the rotation shaft (S1052) at the other end of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the other end of the rotation shaft (S110) is served as an output/input end;

--The rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S101) of the engine (ICE100);

--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE 100).

[0038] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
180 of 584

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

[0039] FIG. 10 is a schematic view showing the structure shown in FIG. 9 in which the epicyclic gear set (EG201) and the controllable brake device (BK104) being installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102).

[0040] As shown in FIG. 10, it mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function for inputting the rotary mechanical kinetic energy, as well as having the motor function for converting the input electric power into the mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Epicyclic gear set (EG201): which is constituted by an input wheel (W201) and an output wheel (W202) and at least an epicyclic wheel (W203), and including through bevel gears engaging with each other, or through bevel friction wheel mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S201), the rotation shaft (S202), the rocker arm (A201), the sleeve type rotation shaft (AS201) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
181 of 584

force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

-- Controllable brake device (BK104): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS201) or the rocker arm (A201), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), the rotation shaft (S1052) at the other end of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S202) combined with the output wheel (W202) of the epicyclic gear set (EG201), the other output/input end rotation shaft (S201) combined with the input wheel (W201) of the epicyclic gear set (EG201) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W203) of the epicyclic gear set (EG201) is provided for driving the rocker arm (A201) and the sleeve type rotation shaft (AS201), the sleeve type rotate shaft (AS201) rotates on the rotation shaft (S201), and the sleeve type rotate shaft (AS201) is connected to an action side of the controllable brake device (BK104), the other action side of the controllable brake device (BK104) is fixed in the housing (H100), and the other end of the rotation shaft (S110) is served as an output/input end;

--The rotation shaft (S101) combined with the input wheel (W 101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100);

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK104) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) are able to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S201) and the rotation shaft (S202), one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive to the rotation shaft (S110), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100).

[0041] The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the en-

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
182 of 584

gine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

Claims

1. A hybrid power train having epicyclic type clutch device, in which the controllable brake device is used to control the power train having the epicyclic gear set serving as a clutch device, which can be widely applied in a hybrid power train with dual rotary kinetic power devices composed of an engine (ICE100) and a rotational electric machine mainly served as motor function (EM102), or a hybrid power train with triple rotary kinetic power sources composed of an engine (ICE100) and a rotational electric machine mainly served as power generator function (EM101) and a rotational electric machine mainly served as motor function (EM102), wherein the structural configuration of each rotary kinetic power device combining with a transmission device includes a coaxial in-series structure or a multiple axial in-parallel structure for satisfying the requirement of applied space;
the structure includes that a rocker arm (A101) and a sleeve type rotation shaft (AS101) driven by an engine (ICE100) and an epicyclic wheel (W103) of an epicyclic gear set (EG101) are combined with a controllable brake device (BK101), and an input wheel (W102) of the epicyclic gear set (EG101) and an output/input end of a rotation shaft (S102) are combined with a rotational electric machine mainly served as motor function (EM102) and an output/input end rotation shaft (S1026), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
183 of 584

rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W 102) and at least an epicyclic wheel (W 103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--One end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the other end of the rotation shaft (S101) is combined with an output/input end rotation shaft (S1011) of the engine (ICE100), and the rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is served as an output/input end for being combined with an output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), the other output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102) is combined with a rotation shaft (S1026) for being served as an output/input end;

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
184 of 584

(SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

2. A hybrid power train having epicyclic type clutch device as claimed in claim 1, wherein it further includes the structure that a first transmission device (T1) is installed between the engine (ICE100) and the controllable brake device (BK101), and the input wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) are combined with the rotational electric machine mainly served as motor function (EM102) and the output/input end rotation shaft (S1026), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--First transmission device (T1): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
185 of 584

--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1012) of the first transmission device (T1), and the output/input end rotation shaft (S1013) at the other end of the first transmission device (T1) is combined with the output/input end rotation shaft (S1011) of the engine (ICE 100);

--The rotation shaft (S102) combined with the output wheel (W 102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE 100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE 100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
186 of 584

(ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

3. A hybrid power train having epicyclic type clutch device as claimed in claim 1, wherein it further includes the structure that the rotational electric machine mainly served as power generator function (EM101) is installed between the engine (ICE100) and the controllable brake device (BK101), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function from the inputting rotary mechanical kinetic energy, and also having the motor function for converting the input electric power into mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W 102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined to the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101);

--The rotation shaft (S102) combined with the output wheel (W 102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026) for serving as the output/input end;

--The output/input end rotation shaft (S1011) of the engine (ICE100) is combined with the output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101) is combined with the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device (BK101), the other action side of the controllable brake device (BK101) is fixed in a housing

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
187 of 584

(H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE 100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD141) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
188 of 584

and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

4. A hybrid power train having epicyclic type clutch device as claimed in claim 2, wherein it further includes the structure that the rotational electric machine mainly served as power generator function (EM101) is installed between the first transmission device (T1) and the controllable brake device (BK101), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function from the inputting rotary mechanical kinetic energy, and also having the motor function for converting the input electric power into mechanical rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);
-- Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);
--First transmission device (T1): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;
--The other end of the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG 101) is combined to the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1012) of the first transmission device (T1), and the other output/input end rotation shaft (S1013) of the first transmission device (T1) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100);
--The rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102), and the output/input end rotation shaft (S1025) at the other end of the rotational electric machine mainly served as motor function (EM102) is combined with the rotation shaft (S1026) for serving as the output/input end;
--The output/input end rotation shaft (S1011) of the engine (ICE100) is combined with the output/input end rotation shaft (S1013) of the first transmission device (T1), the other output/input end rotation shaft (S1012) of the first transmission device (T1) is combined with the output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101) is combined with rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101);
--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), the sleeve type rotation shaft (AS101) or the rocker arm (A101) is combined to an action side of the controllable brake device

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
189 of 584

(BK101), the other action side of the controllable brake device (BK101) is fixed in a housing (H100), and through controlling the controllable brake device (BK101) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the rotation shaft (S102) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S1026); for example controlling one or both of the engine (ICE 100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S1026), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD 101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
190 of 584

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

5. A hybrid power train having epicyclic type clutch device as claimed in claim 1, wherein it further structured by the engine (ICE100) and a transmission unit (T200) and the epicyclic gear set (EG101) and a controllable brake device (BK102), and the output wheel (W102) of the epicyclic gear set (EG101) and the output/input end of the rotation shaft (S102) are combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) is provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is used to drive the input end of the transmission unit (T200), and the output end of the transmission unit (T200) is installed with a rotation shaft (S110), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W 103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);
--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);
--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;
--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with the controllable brake device (BK102) and combined with the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);
--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
191 of 584

function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

6. A hybrid power train having epicyclic type clutch device as claimed in claim 5, wherein it further includes the structure that the input wheel (W101) of the epicyclic gear set (EG101) is combined with the rotation shaft (S101) and combined with the rotation shaft (S1011) of the engine (ICE100), the rotation shaft (S101) is combined to an action side of a controllable brake device (BK103), and the other action end of the controllable brake device (BK103) is fixed in the housing (H100), the output/input end of the rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined with a rocker arm (A111) of a planetary gear set (T300), an outer annular wheel (W113) of the planetary gear set (T300) is fixed in the housing (H100), a sun wheel (W111) of the planetary gear set (T300) is combined with the rotational electric machine mainly served as motor function (EM102), the epicyclic wheel (W103) of the epicyclic gear set (EG101) is provided for driving the rocker arm (A101) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is provided for driving the input end of the transmission unit (T200), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
192 of 584

rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W 102) and at least an epicyclic wheel (W 103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

-- Planetary gear set (T300): which is constituted by a sun wheel (W111), a planetary wheel (W112), an outer annular wheel (W113) composed of friction wheels or gears, and a shell fixed in the housing (H100), wherein the outer annular wheel (W113) is fixed in the shell then fixed in the housing or directly fixed in the housing, the planetary wheel (W112) is combined with the rocker arm (A111) and connected to the rotation shaft (S102), and the sun wheel (W111) is connected to the output/input end rotation shaft (S1024) of the rotational electric machine mainly served as motor function (EM102);

--The output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), the other action side of the controllable brake device (BK102) is fixed in the housing (H100), and the other end of the rotation shaft (S102) is connected to the rocker arm (A111) driven by the planetary wheel (W112) of the planetary gear set (T300);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is connected to the rocker arm (A101) and connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101) and drives the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the rotation shaft (S110);

--The output/input end rotation shaft (S1011) of the engine (ICE 100) is connected to the rotation shaft (S101), the rotation shaft (S101) is connected to the input wheel (W101) of the epicyclic gear set (EG101), as well as connected to an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK103) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) is enabled to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S102) and the sleeve type rotation shaft (AS101), one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive the rotation shaft (S110);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
193 of 584

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;
--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);
--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;
--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;
--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;
--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);
--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);
--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;
--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;
--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);
--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;
--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;
--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

7. A hybrid power train having epicyclic type clutch device as claimed in claim 5, wherein it further includes the structure that the rotational electric machine mainly served as motor function (EM 102) is installed at one end of the output/input end rotation shaft (S110) of the transmission unit (T200), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;
--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;
-- Epicyclic gear set (EG101): which is consti-

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
194 of 584

tuted by an input wheel (W101) and an output wheel (W 102) and at least an epicyclic wheel (W 103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the other end of the rotation shaft (S110) is served as an output/input end;

--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE 100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
195 of 584

(SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery, or the capacitor, or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

8. A hybrid power train having epicyclic type clutch device as claimed in claim 7, wherein it further includes the structure that an epicyclic gear set (EG201) and a controllable brake device (BK104) are installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Epicyclic gear set (EG201): which is constituted by an input wheel (W201) and an output wheel (W202) and at least an epicyclic wheel (W203), and including through bevel gears engaging with each other, or through bevel friction wheel mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S201), the rotation shaft (S202), the rocker arm (A201), the sleeve type rotation shaft (AS201) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

-- Controllable brake device (BK104): which is constituted by a brake device controlled by a

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
196 of 584

manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS201) or the rocker arm (A201), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG 101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S202) combined with the output wheel (W202) of the epicyclic gear set (EG201), the other output/input end rotation shaft (S201) combined with the input wheel (W201) of the epicyclic gear set (EG201) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W203) of the epicyclic gear set (EG201) is provided for driving the rocker arm (A201) and the sleeve type rotation shaft (AS201), the sleeve type rotate shaft (AS201) rotates on the rotation shaft (S201) and is provided for connecting to an action side of the controllable brake device (BK104), the other action side of the controllable brake device (BK104) is fixed in the housing (H100), and the other end of the rotation shaft (S110) is served as an output/input end;

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK104) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) is enabled to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S201) and the rotation shaft (S202), one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive the rotation shaft (S110);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE 100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
197 of 584

electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

9. A hybrid power train having epicyclic type clutch device as claimed in claim 7, wherein it further includes the structure that the rotational electric machine mainly served as power generator function (EM101) is installed between the engine (ICE100) and the rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function for inputting the rotary mechanical kinetic energy, as well as having the motor function for converting the input electric power into the mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W 103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
198 of 584

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device;

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), the rotation shaft (S1052) at the other end of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the other end of the rotation shaft (S110) is served as an output/input end;

--The rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100);

--Through controlling the controllable brake device (BK102) to perform brake locking or releasing, the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) are enabled to be controlled, so as to further control the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110); for example controlling one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) to drive the rotation shaft (S110), or the engine (ICE100) drives the rotational electric machine mainly served as power generator function (EM101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
199 of 584

electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

10. A hybrid power train having epicyclic type clutch device as claimed in claim 9, wherein it further includes the structure that the epicyclic gear set (EG201) and the controllable brake device (BK104) are installed between one end of the output/input end rotation shaft (S110) of the transmission unit (T200) and the rotational electric machine mainly served as motor function (EM102), which mainly consists of:

--Engine (ICE100): which is constituted by a rotary kinetic power source capable of generating rotary kinetic power output, including an internal combustion engine, external combustion engine, Sterling engine and turbine engine;

--Rotational electric machine mainly served as motor function (EM102): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combined with a transmission unit, mainly having the motor function for converting the input electric power into the rotary mechanical kinetic energy, as well as having the power generator function for reversely inputting the rotary kinetic energy;

--Rotational electric machine mainly served as power generator function (EM101): which is constituted by a rotational electric machine, or constituted by a rotational electric machine combining with a transmission unit, mainly having the power generator function for inputting the rotary mechanical kinetic energy, as well as having the motor function for converting the input electric power into the mechanical rotary kinetic energy;

-- Epicyclic gear set (EG101): which is constituted by an input wheel (W101) and an output wheel (W102) and at least an epicyclic wheel (W103), and including through bevel gears engaging with each other, or through bevel friction wheels mutually performing friction transmissions to form an epicyclic gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, and installed with a shell for being combined with the housing (H100);

-- Epicyclic gear set (EG201): which is constituted by an input wheel (W201) and an output wheel (W202) and at least an epicyclic wheel (W203), and including through bevel gears engaging with each other, or through bevel friction wheel mutually performing friction transmissions to form an epicyclic gear set function, and

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
200 of 584

structured by the rotation shaft (S201), the rotation shaft (S202), the rocker arm (A201), the sleeve type rotation shaft (AS201) and a bearing, and installed with a shell for being combined with the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

-- Controllable brake device (BK104): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS201) or the rocker arm (A201), and the other action side is fixed in the housing (H100);

--Transmission unit (T200): which is constituted by the automatic, manumatic, semi-automatic, or manual gear shifting device with fixed or variable speed ratios which is further structured by a transmission gear set composed of gears, friction wheels, pulleys and pulley belts, chains and chain wheels, or a planetary type transmission gear set, or an epicyclic type transmission gear set, the CVT, or the hydraulic transmission device

--One end of the rotation shaft (S101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), the rotation shaft (S1052) at the other end of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100), the other end of the rotation shaft (S101) is combined with the input wheel (W101) of the epicyclic gear set (EG101), the output/input end rotation shaft (S102) combined with the output wheel (W102) of the epicyclic gear set (EG101) is combined to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

--The epicyclic wheel (W103) of the epicyclic gear set (EG101) is combined with the rocker arm (A101) and combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotates on the rotation shaft (S101), and the sleeve type rotation shaft (AS101) is used to drive the output/input end rotation shaft (S1031) of the transmission unit (T200), and the other output/input end rotation shaft (S1032) of the transmission unit (T200) is provided for driving the output/input end rotation shaft (S110);

--One end of the rotation shaft (S110) is combined with the output/input end rotation shaft (S202) combined with the output wheel (W202) of the epicyclic gear set (EG201), the other output/input end rotation shaft (S201) combined with the input wheel (W201) of the epicyclic gear set (EG201) is combined with the output/input end rotation shaft (S1025) of the rotational electric machine mainly served as motor function (EM102), and the epicyclic wheel (W203) of the epicyclic gear set (EG201) is provided for driving the rocker arm (A201) and the sleeve type rotation shaft (AS201), the sleeve type rotate shaft (AS201) rotates on the rotation shaft (S201), and the sleeve type rotate shaft (AS201) is connected to an action side of the controllable brake device (BK104), the other action side of the controllable brake device (BK104) is fixed in the housing (H100), and the other end of the rotation shaft (S110) is served as an output/input end;

--The rotation shaft (S101) combined with the input wheel (W101) of the epicyclic gear set (EG101) is combined with the output/input end rotation shaft (S1051) of the rotational electric machine mainly served as power generator function (EM101), and the other output/input end rotation shaft (S1052) of the rotational electric machine mainly served as power generator function (EM101) is combined with the output/input end rotation shaft (S1011) of the engine (ICE100);

--Through controlling one or both of the controllable brake device (BK102) and the controllable brake device (BK104) to perform brake locking or releasing, the operation relation between the engine (ICE100), the rotational electric machine mainly served as power generator function (EM101), the rotational electric machine mainly served as motor function (EM102) and the rotation shaft (S110) are able to be controlled; for example controlling the operations of connecting for transmission or releasing functions between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) or between the rotation shaft (S201) and the rotation shaft (S202), one or both of the engine (ICE100) and the rotational electric machine mainly served as motor function (EM102) is further controlled to drive to the rotation shaft (S110), or the engine (ICE100) drives the rotational electric machine mainly

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
201 of 584

served as power generator function (EM 101) to operate as the power generator function, or the rotational electric machine mainly served as power generator function (EM101) is operated as the motor function to actuate and drive the engine (ICE100);

The above-mentioned system includes a part or all of the following operation and control devices and the peripheral operation assisting devices including:

--Start motor (SM101): which is constituted by a brush or brushless DC or AC motor, or constituted by a start motor having power generator function, and through operating a start switch (SS101), the electric power of a start battery (SB101) is controlled to drive the start motor (SM101), for linking the engine (ICE100) directly or via a transmission device;

--Start switch (SS101): which is constituted by an electromechanical switch unit or solid state electronic switch unit, for controlling the start battery (SB101) to supply electricity to the start motor (SM101);

--Start Battery (SB101): which is constituted by various rechargeable secondary batteries or super capacitors, for providing electric power to the start motor (SM101), and receiving the electric power generated by a power generator (G101) driven by the engine (ICE100) or the external electric power for charging;

--Power generator (G101): which is constituted by an AC or DC power generator, and directly linked by the engine or linked via a transmission device for respectively generating relative AC electric power or DC output after being rectified, or directly generating DC electric power for outputting; when the start motor is equipped with the power generator function, the mentioned power generator can be optionally installed;

--Regulation device (REG101): which is constituted by an electromechanical or solid state electronic circuit, for respectively regulating the electric power outputted by the power generator (G101) or the electric power outputted while the start motor being operated as the power generator function, so as to charge the start battery (SB101) and supply electric power to other loads;

--Ignition device (ING101): which is constituted by the electromechanical circuit component or the solid state electronic circuit component, or constituted through utilizing the two components, for igniting the engine to operate, and controlled by an engine operation control device (ICEC101);

--Fuel control device (FC101): which is constituted including a fuel jetting mechanism with opening/closing throttle function to control the fuel jetting width, and a control circuit device capable of controlling the fuel jetting mechanism with respect to the opening degree of throttle, the temperature of engine oil, the temperature of intake air, and the oxygen containment crankshaft (IP-ARB) signals, and is subjected to the control of the engine operation control device (ICEC101);

--Fuel tank (TANK101): a storage chamber for storing the fuel required by the engine;

--Drive electric circuit unit (ECU101): which is constituted by electromechanical or solid state electronic units for receiving the control commands of a central control unit (CCU101) to drive the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the motor function, or to control the rotational electric machine mainly served as power generator function (EM101) and the rotational electric machine mainly served as motor function (EM102) to operate as the power generator function, so as to charge an electricity storage device (ESD101) or to output the electric power to other loads;

--Central control unit (CCU101): which is constituted by electromechanical or solid state electronic units, for outputting the control command, so as to control the drive electric circuit unit (ECU101) and the engine operation control device (ICEC101);

--Electricity storage device (ESD101): constituted by the rechargeable secondary battery or the capacitor or the super capacitor;

--Operation interface (OP101): receiving the manual operations or the inputted signals for controlling the central control unit (CCU101) so as to control the hybrid power train having epicyclic type clutch device;

--Engine operation control device (ICEC101): receiving the control command of the central control unit (CCU101) to control the operations of actuating, stopping, regulating rotation speed, increasing/decreasing fuel jetted into engine and the ignition of the engine (ICE100); constituted by electromechanical or electronic units and control mechanisms.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
202 of 584

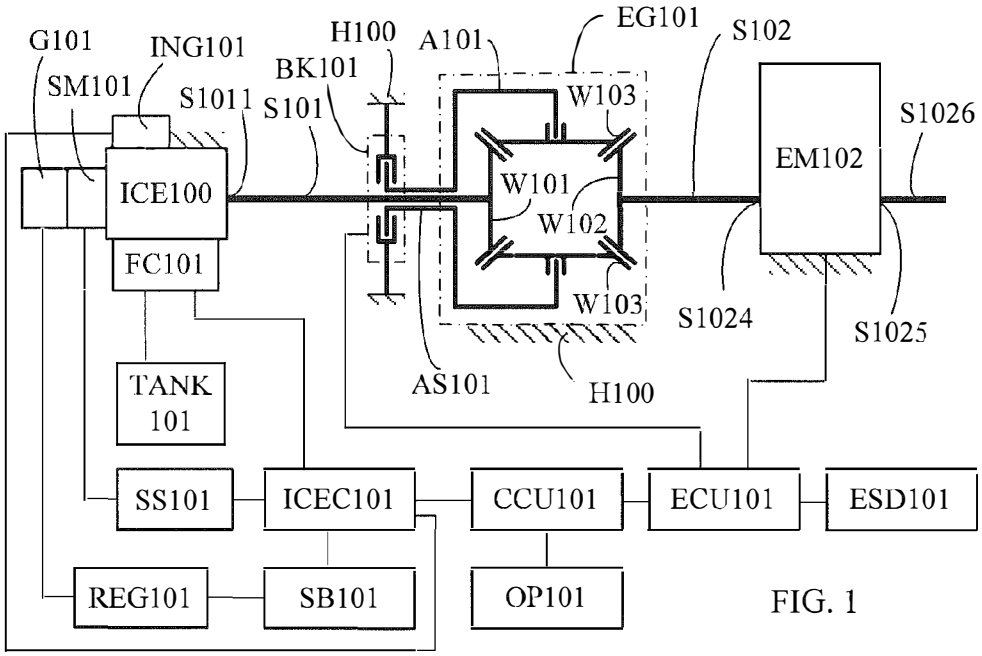


FIG. 1

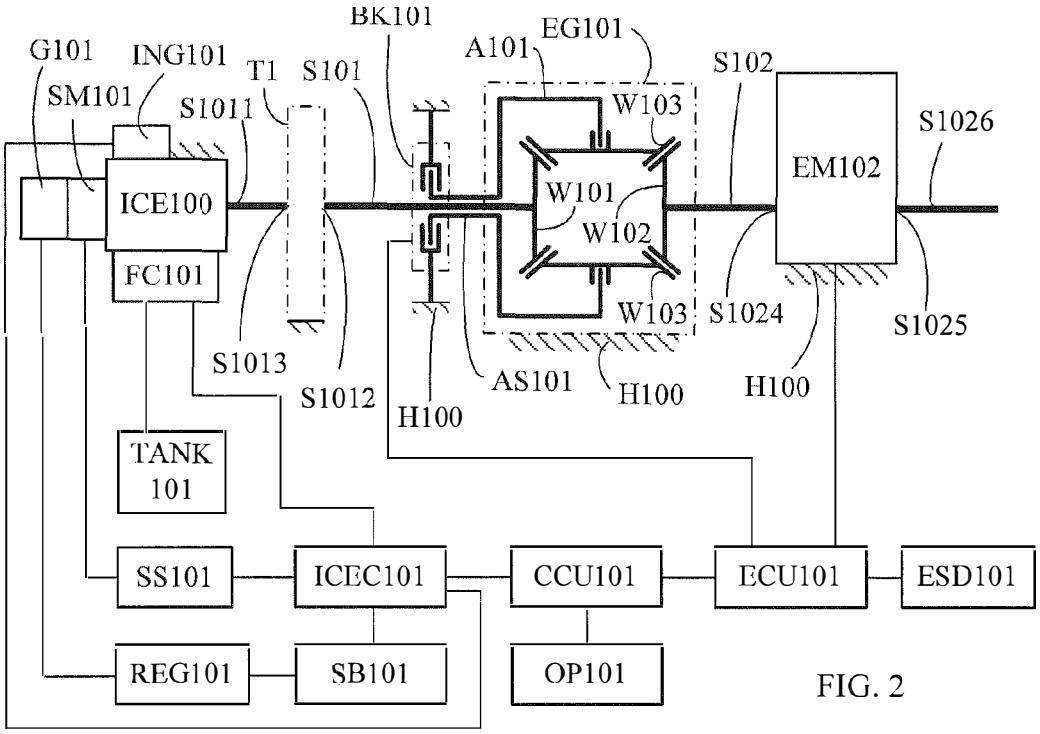


FIG. 2

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
203 of 584

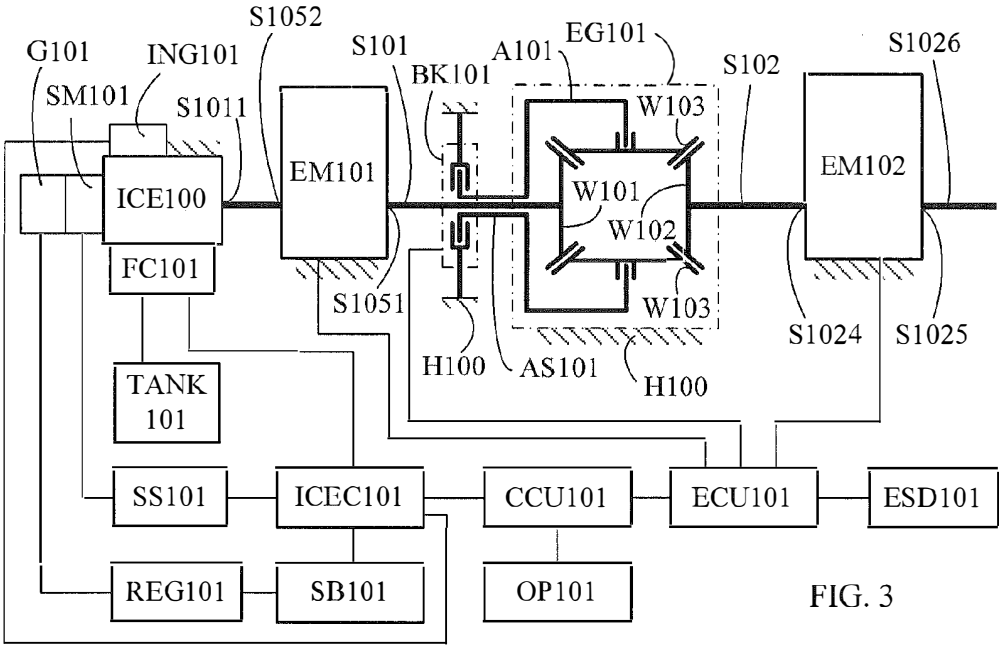


FIG. 3

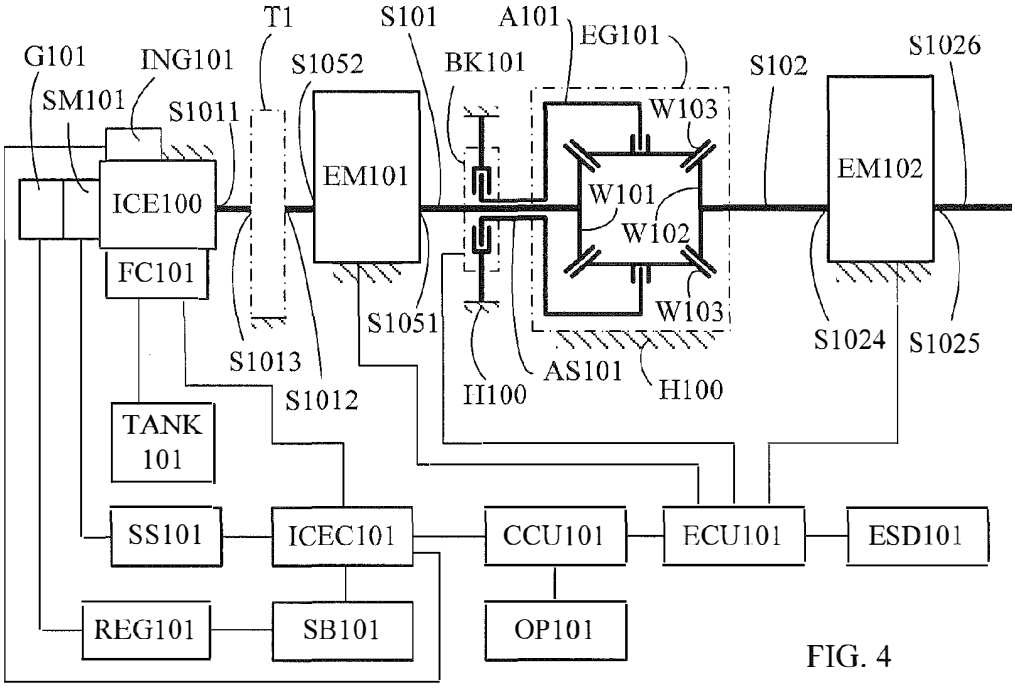


FIG. 4

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
204 of 584

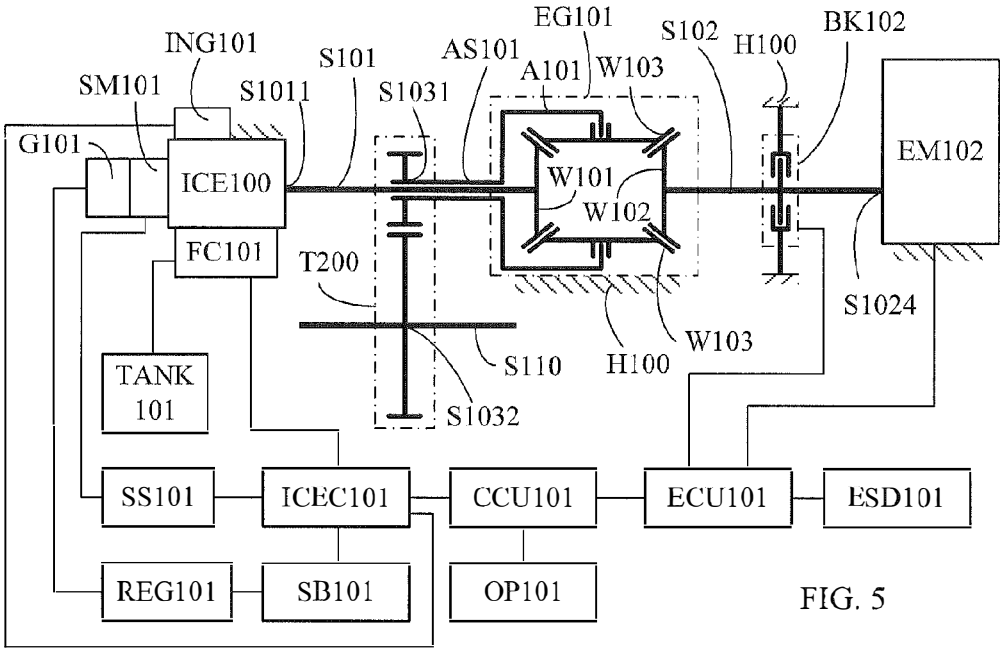


FIG. 5

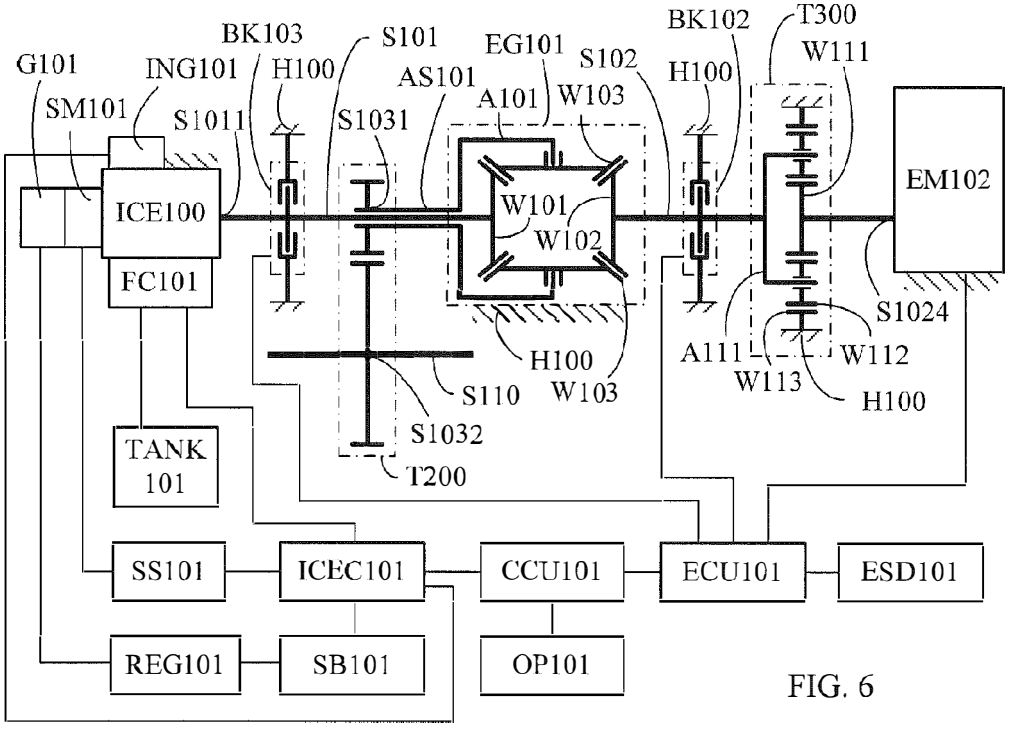


FIG. 6

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
205 of 584

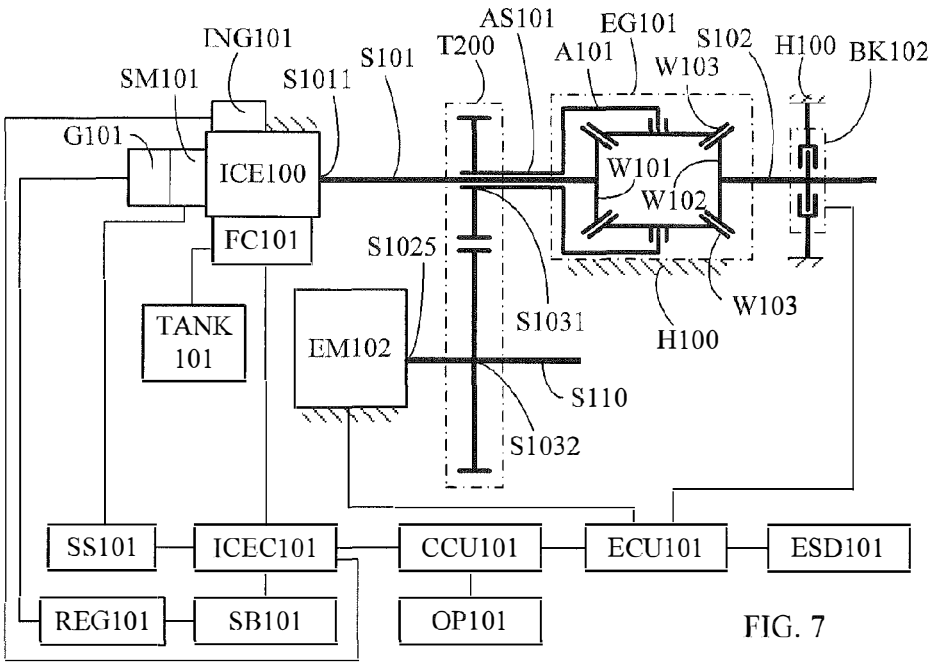


FIG. 7

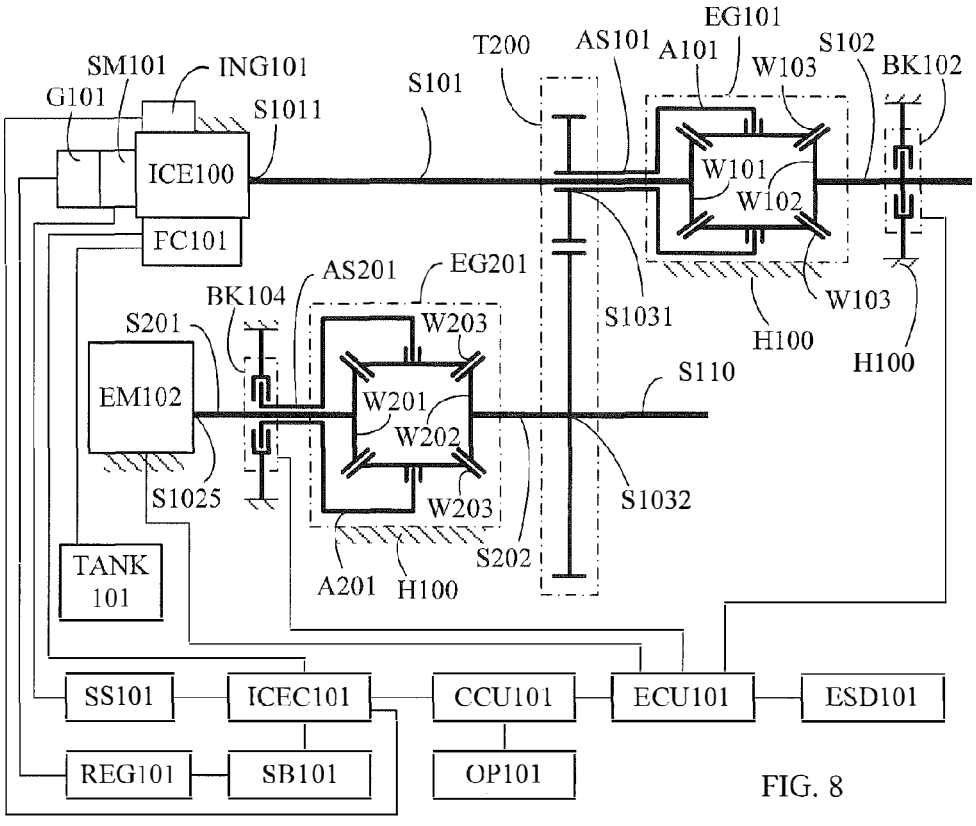


FIG. 8

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
206 of 584

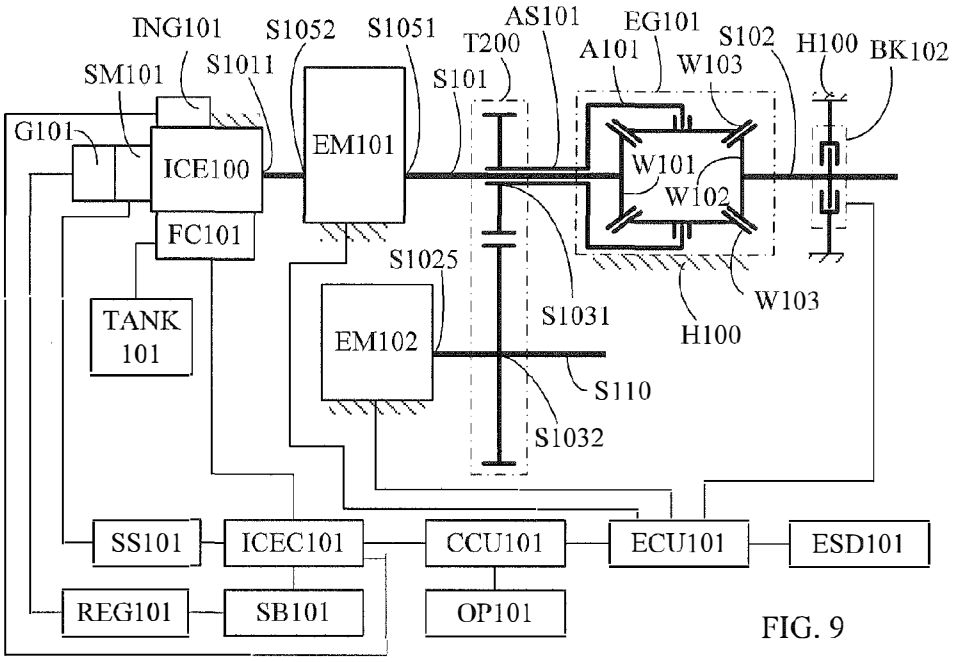


FIG. 9

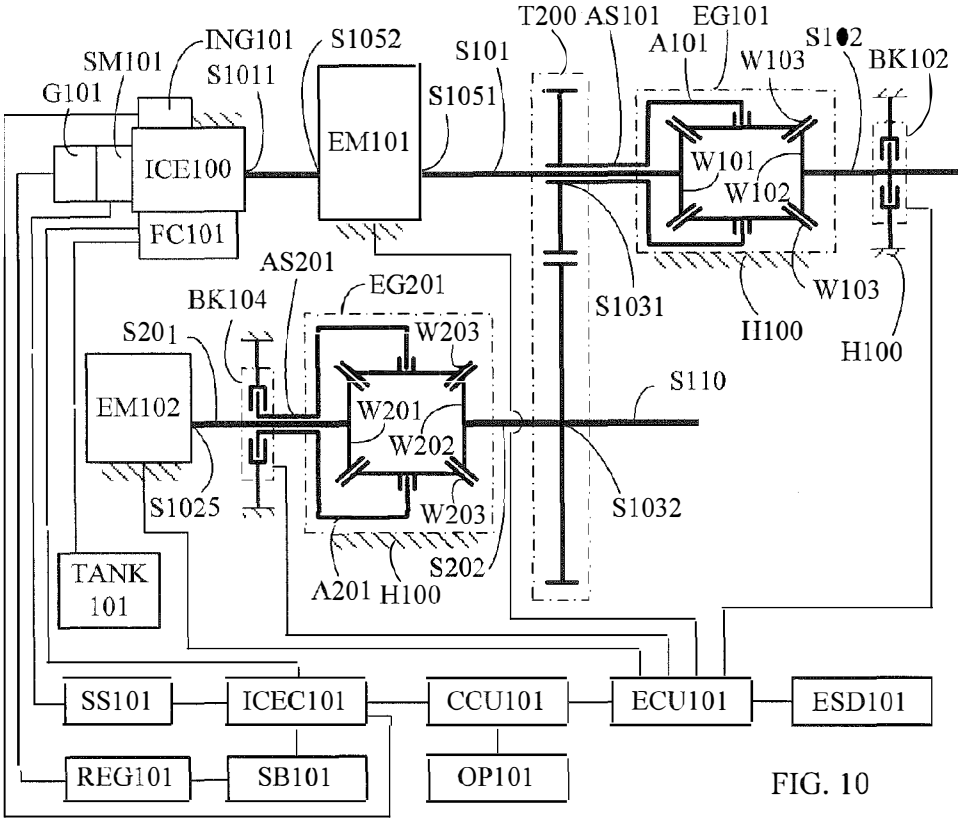


FIG. 10

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
207 of 584

Electronic Acknowledgement Receipt

EFS ID:	43822259
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	21-SEP-2021
Filing Date:	04-MAY-2020
Time Stamp:	15:01:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

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)	256975US11_IDS.pdf	1034585 24f68df0107616c2dbba03a513fc23be99993f4d	no	4

Warnings:

Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Foreign Reference	256975US11_EP2055549.pdf	2791288 18ee4d88434c418fcaf78e267486afb510actf90	no	22
Warnings:					
Information:					
3	Foreign Reference	256975US11_EP2497666.pdf	7202138 b979d609be3ce70356dca3e137e4dde853ce6080	no	45
Warnings:					
Information:					
			Total Files Size (in bytes):	11028011	

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.

PTO/AIA/26 (04-14)
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 displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 256975-US-11

In re Application of: General Electric Company

Application No.: 16/866,028

Filed: 05-04-2020

For: Electric Drive System and Energy Management Method

The applicant, General Electric Company, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 10,673,358 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 73,016

/Craig M. Drachtman/ — Signature
December 20, 2021 — Date

Craig M. Drachtman — Typed or printed name

Attorney — Title
609-454-3500 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

Electronic Acknowledgement Receipt

EFS ID:	44562202
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	20-DEC-2021
Filing Date:	04-MAY-2020
Time Stamp:	14:15:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer Filed	256975US11_TerminalDisclaimer.pdf	121365 53742e0f2abcf013ab3c798dee49c714ffeba264	no	1

Warnings:

Information:	
Total Files Size (in bytes):	121365

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New Applications Under 35 U.S.C. 111

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

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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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/866,028 *	16/866,028	Zhou et al.	
	Examiner	Art Unit	
	CHAN, KAWING	2846	

Document Code - DISQ	Internal Document - DO NOT MAIL

TERMINAL DISCLAIMER	☐ APPROVED	☑ DISAPPROVED
Date Filed: **20 December 2021**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/FELICIA D ROBERTS/

Technology Center: OPLC

Telephone: (571)272-0550

The disclaimer fee under 37 CFR 1.20(d) has not been submitted, nor is there any pre authorization in the application to charge to a deposit account. (See FP 14.24 and 14.26.07)

Please charge the TD fee and also resubmit the TD.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/866,028 *	16/866,028	Zhou et al.	
	Examiner	Art Unit	
	CHAN, KAWING	2846	

Document Code - DISQ	Internal Document - DO NOT MAIL

TERMINAL DISCLAIMER	☐ APPROVED	☑ DISAPPROVED
Date Filed: **20 December 2021**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/FELICIA D ROBERTS/

Technology Center: OPLC

Telephone: (571)272-0550

The disclaimer fee under 37 CFR 1.20(d) has not been submitted, nor is there any pre authorization in the application to charge to a deposit account. (See FP 14.24 and 14.26.07)

Please charge the TD fee and also resubmit the TD.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

131278 7590 12/24/2021
Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

EXAMINER	
CHAN, KAWING	

ART UNIT	PAPER NUMBER
2846	

NOTIFICATION DATE	DELIVERY MODE
12/24/2021	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

Office Action Summary	**Application No.** 16/866,028	**Applicant(s)** Zhou et al.	
	Examiner KAWING CHAN	**Art Unit** 2846	**AIA (FITF) Status** No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 01/22/2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☑ Claim(s) 1-17 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, 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.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on ____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date See Continuation Sheet.

3) ☑ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Continuation of Attachment(s) 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date: 05/04/2020, 01/22/2021, 03/30/2021, 04/15/2021, 09/21/2021

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 05/04/2020, 01/22/2021, 03/30/2021, 04/15/2021 and 09/21/2021 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq*. for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

4. Claims 1-17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 3-14 and 16-20 of U.S. Patent No. 10,673,358. Although the claims at issue are not identical, they are not patentably distinct from each other because the scope of the claims are essentially the same.

Claim 1 of the patent discloses claim 1 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors

for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 3 of the patent discloses claim 2 of the application.

Claim 4 of the patent discloses claim 3 of the application.

Claim 5 of the patent discloses claim 4 of the application.

Claim 6 of the patent discloses claim 5 of the application.

Claim 7 of the patent discloses claim 6 of the application.

Claim 8 of the patent discloses claim 7 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 10 of the patent discloses claim 8 of the application.

Claim 11 of the patent discloses claim 9 of the application.

Claim 12 of the patent discloses claim 10 of the application.

Claim 13 of the patent discloses claim 11 of the application.

Claim 14 of the patent discloses claim 12 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 16 of the patent discloses claim 13 of the application.

Claim 17 of the patent discloses claim 14 of the application.

Claim 18 of the patent discloses claim 15 of the application.

Claim 19 of the patent discloses claim 16 of the application.

Claim 20 of the patent discloses claim 17 of the application.

5. Claims 1-5, 7-8 and 10-12 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 3-7, 9, 12, 15, 17-18 and 20 of U.S. Patent No. 10,374,529. Although the claims at issue are not identical, they are not patentably distinct from each other because the scope of the claims are essentially the same.

Claim 1 of the patent discloses claim 1 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claims 3-4 of the patent discloses claim 2 of the application.

Claims 5-6 of the patent discloses claim 3 of the application.

Claim 7 of the patent discloses claim 4 of the application.

Claim 9 of the patent discloses claim 5 of the application.

Claim 12 of the patent discloses claim 7 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 15 of the patent discloses claim 8 of the application.

Claim 17 of the patent discloses claim 10 of the application.

Claim 18 of the patent discloses claim 11 of the application.

Claim 20 of the patent discloses claim 12 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the

motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim Rejections - 35 USC § 103

6. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

7. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-4,7-9 and 12-15 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Iida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1).

Regarding claims 1, 7 and 12, Iida discloses an electric drive system for a vehicle (e.g. Fig. 1), comprising: an energy storage system (ESS) (e.g. Fig .1: BA, BB); a power conversion device (e.g. Fig .1: 12A, 12B, 14, 22) coupled to the ESS; a first electric motor (e.g. MG1) coupled to the power conversion device; a second electric motor (e.g. Fig. 1: MG2) coupled to the power conversion device; a transmission device ([0030]) coupled to the first electric motor; a power split device (Fig. 1: 3 & [0030]) coupled to the transmission device and the second electric motor, the power split device comprising

one or more planetary sets ([0030]); and an energy management system (EMS) (e.g. Fig. 1: 30).

Iida fails to disclose, but Shimizu teaches energy management system configured to: enable the first electric motor to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising ([0056]: traveling at a high speed—cruising); and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating or uphill ([0056]: accelerating or uphill both require higher torque; thus, obvious).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of Iida with the teachings of Shimizu to control only one motor when the vehicle is traveling in high speed (i.e. cruising) and both motors when the vehicle is accelerating so that power of the vehicle can be optimally distributed based on different power requests.

Regarding claims 2, 8 and 13, Iida discloses the ESS comprises a first energy storage unit and a second energy storage unit (e.g. Fig. 1: BA, BB).

Regarding claims 3, 9 and 14, Iida discloses the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor (e.g. [0033, 0037]).

Regarding claims 4 and 15, Iida discloses a first inverter (e.g. Fig .1: 14) coupled between the ESS and the first electric motor and a second inverter (e.g. Fig. 1: 22) coupled between the ESS and the second electric motor.

9. Claims 5, 10 and 16 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over lida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1) as applied to claims 1, 7 and 12, and further in view of King et al. (US 7,595,597 B2).

Regarding claims 5, 10 and 16, lida and Shimizu in combination fails to disclose, but King teaches a pre-charging switching device (Fig. 4: 132).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of lida and Shimizu with the teachings of King to include a pre-charging switching device so as to increase lifespan and reliability of electronic components.

10. Claims 6, 11 and 17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over lida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1) as applied to claims 1, 7 and 12, and further in view of Aizawa et al. (US 2005/0082992 A1).

Regarding claims 6, 11 and 17, lida and Shimizu in combination fails to disclose, but Aizawa teaches the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising (MG1, MG2 are either not operating or acting as generator as shown in Figs. 9-10).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of lida and Shimizu with the teachings of Aizawa to operate motor as generator so as to efficiently reserve power.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAWING CHAN whose telephone number is (571)270-3909. The examiner can normally be reached Mon-Fri 9am-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 published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KAWING CHAN/
Primary Examiner, Art Unit 2846

Examiner-Initiated Interview Summary	**Application No.** 16/866,028	**Applicant(s)** Zhou et al.		
	Examiner KAWING CHAN	**Art Unit** 2846	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
KAWING CHAN	Primary Examiner	Telephonic
Craig M. Drachtman	Attorney of Record	

Date of Interview: 15 December 2021

Issues Discussed:

Proposed Amendment(s)

Examiner proposed amendments to replace "enable the first electric motor...in a first mode of operation" with "enable only the first electric motor of the first electric motor and the second electric motor...in a first mode of operation" in claims 1, 7 and 12, and requested filing of terminal disclaimer to put the application in condition of allowance. Applicant verbally agreed with the proposed amendments and filing of TD by Friday 12/17/2021. However, TD was not filed up until the proposed time. Thus, the examiner performed update search and issued an Office action.

/KAWING CHAN/ Primary Examiner, Art Unit 2846	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Notice of References Cited	Application/Control No. 16/866,028	Applicant(s)/Patent Under Reexamination Zhou et al.	
	Examiner KAWING CHAN	Art Unit 2846	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20050070401-A1	03-2005	Shimizu, Kouichi	B60W20/40	477/5
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
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	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	**Art Unit**
	KAWING CHAN	2846

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	12/18/2021								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
228 of 584

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	Art Unit
	KAWING CHAN	2846

CPC - Searched*		
Symbol	Date	Examiner
h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18	12/18/2021	KC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
318	478	12/18/2021	KC

* 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
Assignee and inventor search	12/18/2021	KC
IDS search	12/18/2021	KC
text search	12/18/2021	KC

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/KAWING CHAN/ Primary Examiner, Art Unit 2846	

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
229 of 584

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

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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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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	1							

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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]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
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	First Named Inventor	Jian Zhou
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	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

	1	2004 THS-II-System_Operation	
	2	2008 THS-II-System_Operation	
	3	2010 THS-II-System_Operation	
	4	Case study: Toyota Hybrid Synergy Drive Dr Soheil Seyed Hosseini October 2015 Describes first and second generation THS systems prior to priority date	

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Examiner Signature	/KAWING CHAN/	Date Considered	12/16/2021

*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.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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)	2021-04-15
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.**

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

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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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Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Jian Zhou
	Art Unit	
	Examiner Name	
	Attorney Docket Number	256975-US-11

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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	7963353	B2	2011-06-21	Tatematsu et al.	
	2	8639423	B2	2014-01-28	Shaaf et al.	
	3	7595597	B2	2009-09-29	King; Robert Dean	
	4	7583053	B2	2009-09-01	Kamohara; Hideaki	
	5	7764051	B2	2010-07-27	Ishikawa; Tetsuhiro	
	6	9145131	B2	2015-09-29	Watanabe; Kenta	
	7	5549172		1996-08-27	MUTOH	
	8	7595597	B2	2009-09-29	KING et al.	

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	9	7839013	B2	2010-11-23	NAKAMURA et al.	
	10	7965510	B2	2011-06-21	SUZUKI et al.	
	11	8138720	B2	2012-03-20	SNYDER et al.	
	12	8016061	B2	2011-09-13	JEON et al.	
	13	7688604	B2	2010-03-30	OYOBE et al.	English Family Member of CN101208855A
	14	6608396	B2	2003-08-19	Downer et al.	
	15	7723932	B2	2010-05-25	King et al.	
	16	7285926	B2	2007-10-23	McGarry et al.	
	17	8415909	B2	2013-04-09	Ramamurthy et al.	
	18	5343970		1994-09-06	Severinsky	
	19	6209672	B1	2001-04-03	Severinsky	

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	Examiner Name	
	Attorney Docket Number	256975-US-11

	20	6554088	B2	2003-04-29	Severinsky et al.	
	21	6583599	B1	2003-06-24	Phillips et al.	
	22	8535200	B2	2013-09-17	Vyas et al.	
	23	6271648	B1	2001-08-07	Miller	
	24	6118237	A	2000-09-12	Kikuchi et al.	
	25	7594491	B2	2009-09-29	Yanagida et al.	
	26	8395355	B2	2013-03-12	Kaita et al.	
	27	8469849	B2	2013-06-25	Kruger	
	28	6691809	B2	2004-02-17	Hata et al.	
	29	8387730	B2	2013-03-05	Bouchon	
	30	9561719	B2	2017-02-07	Lo et al.	

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	Attorney Docket Number	256975-US-11

	31	7207915	B2	2007-04-24	Oshidari et al.	
	32	7063637	B2	2006-06-20	Yamauchi et al.	
	33	10374529	B2	2019-08-06	Zhou et al.	
	34	7923866	B2	2011-04-12	Ichikawa	

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	1	20090224720	A1	2009-09-10	Oyobe; Hichirosai	
	2	20120091930	A1	2012-04-19	Takahashi; Kenji	
	3	20130041543	A1	2013-02-14	Takayanagi; Hiroyuki	
	4	20110057588	A1	2011-03-10	Rineh; Ghodratollah Esmaeili	
	5	20080218104	A1	2008-09-11	LUKIC et al.	

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	Attorney Docket Number	256975-US-11

	6	20090242289	A1	2009-10-01	MURTY	
	7	20100222953	A1	2010-09-02	TANG	
	8	20120010041	A1	2012-01-12	SOLIMAN et al.	
	9	20040263099	A1	2004-12-30	MASLOV et al.	
	10	20120010771	A1	2012-01-12	KATO et al.	
	11	20120292985	A1	2012-11-22	SAKAI	
	12	20080197810	A1	2008-08-21	Ishikawa et al.	
	13	20090115375	A1	2009-05-07	Iida	
	14	20100240491	A	2010-09-23	Vyas et al.	
	15	20050082992	A1	2005-04-21	Miller et al.	
	16	20070007939	A1	2007-01-11	Miller et al.	

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	Examiner Name	
	Attorney Docket Number	256975-US-11

	17	20110111909	A1	2011-05-12	Kim et al.	
	18	20120103749	A1	2012-05-03	Kimura et al.	
	19	20030150352	A1	2003-08-14	Kumar	
	20	20040069548	A1	2004-04-15	Kira et al.	
	21	20060169548	A1	2006-08-03	Corbett et al.	
	22	20100219794	A1	2010-09-02	Sugimoto et al.	
	23	20110101915	A1	2011-05-05	Mitsutani	
	24	20060250902	A1	2006-11-09	Bender et al.	
	25	20100051367	A1	2010-03-04	Yamada et al.	
	26	20100019734	A1	2010-01-28	Oyobe et al.	
	27	20100227722	A1	2010-09-09	Conlon	

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	28	20100219777	A1	2010-09-02	Slettevoli	
	29	20090134820	A1	2009-05-28	Sugiyama	
	30	20140152225	A1	2014-06-05	Ahou	

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	1	20110074370	KR	A	2011-06-30	Hyosung Corp.	with English Abstract Only	
	2	102010044497	DE	A	2012-03-08	Magna E Car Systems GmbH & Co.	with English Abstract Only	
	3	101237154	CN	A	2008-08-06	TSINGHUA UNIVERSITY		
	4	101524967	CN	A	2009-09-09	HYUNDAI MOTOR COMPANY	See English Family member US8016061B2	
	5	101844511	CN	A	2010-09-29	BEIQI FUTIAN AUTOMOBILE CO., LTD		
	6	102009023340	DE	A1	2011-02-03	DAIMLER AG		

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	7	2117106	EP	A1	2009-11-11	TOYOTA MOTOR CO LTO		
	8	2439120	EP	A1	2012-04-11	TOYOTA MOTOR CO LTO		
	9	2011001251	WO	A2	2011-01-06	TOYOTA MOTOR CO LTO		
	10	101208855	CN	A	2008-06-25	TOYOTA MOTOR CO., LTD et al.	See English Family Member US7688604B2	
	11	200023313	JP		2000-01-21	Suzuki Motor Corporation		
	12	2006042510	JP	A	2006-02-09	Nissan Motor Co. Ltd.	With English Abstract	
	13	2000295711	JP	A	2010-10-20	FUJI HEAVY IND LTD	With English Abstract	
	14	2005297729	JP	A	2005-10-27	TOYOTA MOTOR CORP	With English Abstract	
	15	2002078106	JP	A	2002-03-15	TOYOTA MOTOR CORP	English Abstract Only	
	16	2000013922	JP	A	2000-01-14	TOYOTA MOTOR CORP	English Abstract Only	
	17	2002078106	JP	A	2002-03-15	TOYOTA MOTOR CORP	With English Abstract	

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	18	2002067723	JP	A	2002-03-08	TOYOTA MOTOR CORP	English Abstract Only	
	19	2002078110	JP	A	2002-03-15	TOYOTA MOTOR CORP	English Abstract Only	
	20	2010130828	JP	A	2010-06-10	HITACHI LTD	With English Abstract	
	21	2004-260904	JP	A	2004-09-16	TOYOTA MOTOR CORP	With English Abstract Only	
	22	2008-312382	JP	A	2008-12-25	TOYOTA MOTOR CORP	With English Abstract Only	
	23	2003333707	JP	A	2003-11-21	TOYOTA MOTOR CORP		X
	24	2006280170	JP	A	2006-10-12	TOSHIBA CORP		☐
	25	2007143374	JP	A	2007-06-07	TOYOTA MOTOR CORP		☐
	26	2013-203109	JP	A	2013-10-07	TOYOTA MOTOR CORP	Abstract Only	☐
	27	2007-325474	JP	A	2007-12-13	TOYOTA MOTOR CORP	Abstract Only	☐
	28	2010-206971	JP	A	2010-09-16	TOYOTA CENTRAL RES & DEV TOYOTA MOTOR CORP	Abstract Only	☐

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	29	2013-207831	JP	A	2013-10-07	TOYOTA MOTOR CORP	Abstract Only	☐
	30	2009-508763	JP	A	2009-03-05	TOYOTA MOTOR CORP	Abstract Only	☐
	31	102007056722	JP	A	2008-07-10	GM GLOBAL TECH OPERATIONS INC [US]	Abstract Only	☐

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	1	NORTHCOTT et al., "Electromagnetic Transient Simulation of Hybrid Electric Vehicles", Industrial Electronics, 2007. ISIE 2007. IEEE International Symposium on, Pages 833-838, 4-7 June 2007.	
	2	NAPOLI et al., "Multiple-Input DC-DC Power Converter for Power-Flow Management in Hybrid Vehicles", Conference Record of the IEEE Industry Applications Conference. IAS Annual Meeting, Pittsburgh, Pennsylvania, USA, Volume No.3, pp. 1578-1585, 13 October 2002.	
	3	Unofficial English Translation of Chinese Office Action issued in connection with corresponding CN Application No. 201210509493.2 on July 13, 2015.	
	4	A copy of European Search Report and Opinion issued in connection with corresponding EP Application No. 13195375.4 on December 21, 2015.	
	5	Unofficial English Translation of Chinese Office Action issued in connection with corresponding CN Application No. 201210509493.2 on March 11, 2016.	
	6	Toyota Prius, "Plug-in Hybrid Gasoline-Electric Hybrid Synergy Drive", Hybrid Vehicle Dismantling Manual, 74 pages, 2011.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Jian Zhou
	Art Unit	
	Examiner Name	
	Attorney Docket Number	256975-US-11

	7	PCED enUSA 2010 Fusion Milan Hybrid, Description and Operation, pages 1-121, 2009.	
	8	Hybrid/Battery Control: Hybrid Control System: Details (2010 Prius PHV), 9-23-2011, https://techinfo.toyota.com/t3Portal/resources/jsp/siviewer/index.jsp?dir=ncf/NM14C0U&href=xtml/RM000004273004X.html&locale=en&model=Prius%20PH, pages 1-65.	
	9	Hybrid/Battery Control: Plug-In Charge Control System: Details; 2012 MY Prius PHV [01/2012-] https://techinfo.toyota.com/t3Portal/resources/jsp/siviewer/index.jsp?dir=ncf/NM19G0U&href=xtml/RM000005417000X.html&locale=en&model=Prius%20PH, pages 1-9.	
	10	Copy of English Translation of Japanese Office Action issued in connection with corresponding JP Application No. 2018-089123 on March 20, 2019.	
	11	Unofficial English Translation of Japanese Office Action issued in connection with corresponding JP Application No. 2013-246847 on September 5, 2017.	
	12	Copy of Notification of Reasons for Refusal for corresponding JP Application No.: 2019-069591dated January 14, 2020.	

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2020-05-04
Name/Print	Craig M. Drachtman	Registration Number	73016

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(Not for submission under 37 CFR 1.99)

Application Number	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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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	9108501	B2	2015-08-18	Ortmann et al.	

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	1	2002078105	JP	A	2002-03-15	TOYOTA MOTOR CORP	English abstract only	

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Examiner Signature	/KAWING CHAN/	Date Considered	12/16/2021

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Signature	/Craig M. Drachtman/	Date (YYYY-MM-DD)	2021-01-22
Name/Print	Craig M. FDrachtman	Registration Number	73,016

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Bibliographic Data

Application No: 16/866,028

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /KAWING CHAN/ Examiner's Signature | Initials

Title: Electric Drive System and Energy Management Method

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
05/04/2020	318	2846	256975-US-11
RULE			

APPLICANTS

General Electric Company, Schenectady, NY,

INVENTORS

Jian Zhou, Shanghai, CHINA

Fei Xu, Shanghai, CHINA

Dong Liu, Shanghai, CHINA

Hai Qiu, Shanghai, CHINA

Pengju Kang, Yorktown Heights, NY, UNITED STATES

CONTINUING DATA

This application is a CON of 16433348 06/06/2019 PAT 10673358

16433348 is a CON of 15453218 03/08/2017 PAT 10374529

15453218 is a CON of 14094086 12/02/2013 PAT 9800182

FOREIGN APPLICATIONS

CHINA CN201210509493.2 12/03/2012

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

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	1	20090015185	A1	2009-01-15	YOSHIDA TADAFUMI	English Family Member of JP2007-220976

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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.

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. /K.C/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"15453218"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 02:28 PM
L2	103	("20090115375"|"6209672"|"8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"8395355"|"8415909"|"8535200"|"5343970"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"20100240491"|"5549172"|"6271648"|"7723932"|"7963353"|"8016061"|"20080197810"|"20130041543"|"6583599"|"7688604"|"7965510"|"20110057588"|"20120091930"|"20120292985"|"7640512"|"7764051"|"20100227722"|"20090224720"|"20090242289"|"6554088"|"8469849").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 02:28 PM
L3	24	("8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"5549172"|"7963353"|"8016061"|"20130041543"|"7688604"|"7965510"|"20100227722"|"20110057588"|"20120091930"|"20120292985"|"7764051"|"20090224720"|"20090242289").PN.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
L4	41	("20090115375"|"6209672"|"8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"8395355"|"8415909"|"8535200"|"5343970"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"20100240491"|"	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
257 of 584

		5549172"|"6271648"|"7723932"|"7963353"|"8016061"|"20080197810"|"20130041543"|"6583599"|"7688604"|"7965510"|"20110057588"|"20120091930"|"20120292985"|"6118237"|"6608396"|"7285926"|"7594491"|"7764051"|"20100227722"|"20090224720"|"20090242289"|"6554088"|"8469849").PN.					
L5	17	L4 not L3	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
L6	3871	(("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY")).AANM.	(USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L7	456	(("ZHOU") near3 ("Jian")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L8	110	(("XU") near3 ("Fei")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L9	267	(("LIU") near3 ("Dong")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L10	37	(("QIU") near3 ("Hai")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L11	67	(("KANG") near3 ("Pengju")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L12	42719	energy near10 storage near10 system	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L13	2598	first near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L14	2223	second near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L15	23086	mechanical near5 torque	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:54 PM
L16	1	L12 L13 L14 L15	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:55 PM
L17	10	L13 L14 L15	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:55 PM
L18	5	("20020079178" | "20120190499" | "20130017928" | "6377882" | "8290651").PN. OR ("8636621").URPN.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 03:10 PM
L19	43	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 03:19 PM

		US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did.					
L20	12	L19 and (induction near5 motor)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:19 PM
L21	33	("2010/0222953").URPN.	(USPAT)	SAME	ON	ON	2018/02/03 03:26 PM
L22	5	"20100019729"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:31 PM
L23	6	"20120103749"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:40 PM
L24	3562	(power near5 split) transmission (motor or load or machine)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:32 AM
L25	40108	(planetary) transmission (motor or load or	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2018/09/01 10:33 AM

		machine)	JPO; DERWENT; IBM_TDB)				
L26	41872	L24 or L25	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L27	414	L26 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L28	45	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM
L29	28	L28 and transmission	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM

L30	8	L28 and (cranking and start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:41 PM
L31	2	L28 and (cranking near5 start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:42 PM
L32	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN"	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 01:43 PM
L33	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 01:46 PM
L34	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/09/04 01:46 PM
L35	1322	((cruising or accelerat$3) near10 mode) near50 ((both or second or first) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:38 AM
L36	17	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L37	23	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794" or "20110101915"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L38	4	"2004260904" or "2008312382"	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L39	0	L35 and (L37 or L38)	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L40	56	(US-20130041543-$ or US-20120292985-$ or	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
261 of 584

		US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L41	4	L35 and L40	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:40 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
262 of 584

L42	710	L35 and (electric near10 vehicle)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:42 AM
L43	39	L42 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:43 AM
L44	1220	first near50 second near50 motor near50 (cruis$3 or accelerat$3) near50 generator	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L45	56	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/24 07:28 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
263 of 584

		6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L46	1	L44 and L45	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L47	111	L44 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:29 AM
L48	141	L44 and cruis$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L49	6	L48 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L50	7	"14094086"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:51 AM
L51	6276	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:27 AM
L52	8173	(cranking or accelerat$3) near50 (first near10 second near10 (motor or generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L53	642	L51 and L52	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L54	80	L53 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L55	900	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
264 of 584

L56	2266	(cranking or accelerat$3) near50 (first near10 second near10 (generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L57	87	L55 and L56	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L58	4	"20070007939" or "201000051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L59	10	"20070007939" or "20100051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L60	18739	318/500.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:45 PM
L61	23595	(cruising or (constant near5 speed) or uphill or accelerat$3) near20 ((first or second or mg1 or mg2) near10 (generator or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L62	8783	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L63	181	L62 and L60	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L64	761	L62 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L65	8557	(cranking or accelerat$3 or uphill) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:48 PM
L66	858	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L67	753	L65 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM

L68	24	L66 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L69	3560	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L70	88	L66 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L71	191	L65 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L72	227	L70 or L71	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L73	2	"6691809".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:20 PM
L74	79	"2006042510" or "2000295711" or "2005297729" or "2002078106" or "2000013922" or "2002278105" or "2002067723" or "2002078110" or "2010130828"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:22 PM
L75	49472	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2019/09/27 12:30 AM
L76	1273	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2019/09/27 12:30 AM
L77	1	"16433348"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:30 AM
L78	17234	318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L79	67899	L75 or L76 or L78	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2019/09/27 12:32 AM

			JPO; DERWENT; IBM_TDB)				
L80	3751	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L81	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L82	9461	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L83	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L84	71	L79 and L81	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L85	89	L79 and L80	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L86	217	L79 and L82	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L87	283	L84 or L85 or L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L88	20	"20110074370" or "102010044497"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:16 AM
L89	76	"2117106"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:17 AM
L90	8	"2117106"	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:18 AM
L91	1	"7923866".pn.	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:19 AM
L92	4	"7923866".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:19 AM
L93	13	("6608396" | "6710575"	(US-PGPUB; USPAT;	SAME	ON	ON	2020/01/21

		| "7750505" | "7795844" | "7847432").PN. OR ("7923866").URPN.	USOCR)				03:19 AM
L94	947	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:20 AM
L95	9774	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L96	1133	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L97	6	(L94 or L95) and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:22 AM
L98	29710	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 01:49 PM
L99	1668	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2021/12/18 01:49 PM
L100	53077	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2021/12/18 01:49 PM
L101	65	("20100219777"|"20120091930"|"6271648"|"7063637"|"7285926"|"8395355"|"8469849"|"8639423"|"20090015185"|"20040069548"|"20090115375"|"20140152225"|"5343970"|"7583053"|"7595597"|"7923866"|"20030150352"|"20040263099"|"20100051367"|"6118237"|"6554088"|"6691809"|"7207915"|"7723932"|"7839013"|"7963353"|"8138720"|"8387730"|"20050082992"|"20060169548"|"20090224	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:50 PM

		720"|"20110111909"|"20120010771"|"20120292985"|"20130041543"|"6209672"|"6608396"|"7594491"|"7688604"|"7965510"|"20060250902"|"20100240491"|"20120010041"|"5549172"|"6583599"|"9145131"|"9108501"|"20080197810"|"20080218104"|"20100019734"|"20100219794"|"20100222953"|"20120103749"|"8535200"|"20070007939"|"20090134820"|"7764051"|"8016061"|"8415909"|"9561719"|"10374529"|"20090242289"|"20100227722"|"20110057588"|"20110101915").PN.					
L102	0	vehicle near50 crusi$3 near50 motor near50 (second) near50 (uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L103	4961	vehicle near50 motor near50 (second) near50 (cruis$3 OR uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L104	229	(98 OR 99 OR 100 OR 101) AND 103	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L105	52	vehicle near50 motor near50 both near50 first near50 (second) near50 ((cruis$3 OR uphill OR accelerat$3) near10 (mode OR state OR condition OR status))	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:57 PM
L106	78	((US-20120103749-A1 OR US-20190288616-A1 OR US-20090134820-A1 OR US-20100219777-A1 OR US-20050082992-A1 OR US-20130041543-A1 OR US-20100019729-A1 OR US-20140152225-A1 OR US-20170174098-A1 OR US-20090115375-A1 OR US-20050070401-A1 OR US-20100219794-A1 OR US-20110101915-A1 OR US-20060169548-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
269 of 584

		A1 OR US-20040069548-A1 OR US-20030150352-A1 OR US-20100051367-A1 OR US-20070007939-A1 OR US-20040263099-A1 OR US-20120292985-A1 OR US-20120091930-A1 OR US-20120010771-A1 OR US-20120010041-A1 OR US-20110057588-A1 OR US-20100227722-A1 OR US-20100222953-A1 OR US-20090242289-A1 OR US-20090224720-A1 OR US-20080218104-A1 OR US-20110111909-A1 OR US-20100240491-A1 OR US-20100019734-A1 OR US-20080197810-A1 OR US-20090015185-A1 OR US-20060250902-A1).did. AND PGPB.dbnm.) OR ((US-10374529-B2 OR US-7923866-B2 OR US-10291158-B2 OR US-8630761-B2 OR US-5343970-A OR US-7595597-B2 OR US-8016061-B2 OR US-7965510-B2 OR US-6608396-B2 OR US-5549172-A OR US-6554088-B2 OR US-7688604-B2 OR US-9561719-B2 OR US-8387730-B2 OR US-7583053-B2 OR US-6691809-B2 OR US-9145131-B2 OR US-8138720-B2 OR US-8639423-B2 OR US-7963353-B2 OR US-7839013-B2 OR US-7764051-B2 OR US-9108501-B2 OR US-8535200-B2 OR US-8469849-B2 OR US-8415909-B2 OR US-8395355-B2 OR US-7723932-B2 OR US-					

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
270 of 584

		7594491-B2 OR US-7207915-B2 OR US-7285926-B2 OR US-7063637-B2 OR US-6583599-B1 OR US-6271648-B1 OR US-6118237-A OR US-6209672-B1).did. AND USPT.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A).did. AND JPAB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A OR DE-102010044497-A1).did. AND DWPI.dbnm.) OR ((KR-20110074370-A).did. AND FPRS.dbnm.) OR ((EP-2117106-A1).did. AND EPAB.dbnm.)					
L107	7	106 AND uphill	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM
L108	3	"16433348"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 03:00 PM
L109	19	"10374529"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR,	SAME	ON	ON	2021/12/18 03:22 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
271 of 584

			HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N98	5735	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N99	733	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N100	305	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:21 AM
N101	5	(N98 or N99) and N100	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N102	376	N98 and N99	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N103	5383	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N104	53	N102 and N103	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N105	2001	((cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N106	146	((cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N107	298	(N105 or N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM
N108	7	(N105 and N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM

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	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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	1	2055549	EP	A2	2009-06-05	GM Global Technology Operations, Inc.		
	2	2497666	EP	A2	2012-09-12	Yang		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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	/KAWING CHAN/	Date Considered	12/16/2021

*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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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)	2021-09-21
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.**

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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:

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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.

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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.

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. /K.C/

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Jian Zhou et al. **Application No.:** 16/866,028 **Confirmation No.:** 1053 **Filed:** May 4, 2020 **For:** Electric drive system and energy management method **Group:** 2846 **Examiner:** Chan, Kawing	**Our File:** 256975-US-11 **Date:** February 4, 2022

REPLY PURSUANT TO 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Examiner:

This Reply is being timely filed in response to the Non-final Office Action dated December 24, 2021.

Please amend the application without prejudice or disclaimer as follows:

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating.

2. (Original) The drive system of claim 1, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
278 of 584

3. (Original) The drive system of claim 2, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

4. (Original) The drive system of claim 1, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

5. (Original) The drive system of claim 1, further comprising a pre-charging switching device.

6. (Original) The drive system of claim 1, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

7. (Currently Amended) An electric drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first inverter coupled to the power conversion device;

a first AC motor coupled to the first inverter;

a second inverter coupled to the power conversion device;

a second AC motor coupled to the second inverter;

a transmission device coupled to the first AC motor;

a power split device coupled to the transmission device and the second AC motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to selectively:

enable only the first AC motor of the first and second AC motors

to operate as a motor to drive the vehicle through the transmission device when the vehicle is cruising; and

enable the first AC motor to operate as a motor to drive the vehicle through the transmission device and enable the second AC motor to operate as a motor to drive the vehicle through the power split device when the vehicle is accelerating.

8. (Original) The electric drive system of claim 7, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

9. (Original) The drive system of claim 8, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

10. (Original) The electric drive system of claim 7, further comprising a pre-charging switching device.

11. (Original) The electric drive system of claim 7, wherein the EMS is further configured to enable the second AC motor to operate as a generator when the vehicle is cruising.

12. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a third mode of operation when the vehicle is in an uphill mode.

13. (Original) The drive system of claim 12, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

14. (Original) The drive system of claim 13, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

15. (Original) The drive system of claim 12, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

16. (Original) The drive system of claim 12, further comprising a pre-charging switching device.

17. (Original) The drive system of claim 12, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
282 of 584

REMARKS/ARGUMENTS

After the foregoing Amendment, claims 1-17 are currently pending in this application. Claims 1, 7, and 12 are amended. No new matter is added.

Double Patenting

Claims 1-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-14, and 16-20 of US 10,673,358. Claims 1-5, 7-8, and 10-12 are rejected under obviousness-type double patenting as being unpatentable over claims 1, 3-7, 9, 12, 15, 17-18, and 20 of US 10,374,529. Without agreeing to the rejection, in order to further prosecution, a Terminal Disclaimer is submitted herewith to overcome the obviousness-type double patenting rejection. A Terminal Disclaimer was also submitted on December 20, 2021. As such, withdrawal of the double patenting rejection is respectfully requested.

Claim Rejections – 35 USC § 103

Claims 1-4, 7-9, and 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iida (US 2009/0115375) in view of Shimizu (US 2005/0070401). Claims 5, 10, and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iida in view of Shimizu and King (US 7,595,597). Claims 6, 11, and 17 are rejected

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
283 of 584

under 35 U.S.C. § 103(a) as being unpatentable over Iida in view of Shimizu and Aizawa (US 2005/0082992). Reconsideration is respectfully requested.

Independent claim 1, and all claims dependent therefrom, are distinguishable over the prior art and in condition for allowance for at least the following reasons. Independent claim 1 as amended recites: A drive system for a vehicle, comprising: an energy storage system (ESS); a power conversion device coupled to the ESS; a first electric motor coupled to the power conversion device; a second electric motor coupled to the power conversion device; a transmission device coupled to the first electric motor; a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and an energy management system (EMS) configured to: enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating. Support for the amendment is found in at least Figure 7 and paragraphs [0074]-[0082] of the application as filed. Thus, no new matter is added.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
284 of 584

Without agreeing to the rejection, to further prosecution, independent claim 1 has been amended to further describe how the electric motors are operated. In particular, none of the references cited disclose, teach, or suggest "an energy management system (EMS) configured to: enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating", as recited in amended claim 1. The Examiner indicated this amendment would be considered allowable subject matter in a teleconference on December 15, 2021. As such, allowance of independent claim 1 is respectfully requested.

Claims 2-6 are dependent upon independent claim 1 and these claims are allowable over the cited references for the same reasons provided above.

Similar amendments made regarding independent claim 1 have been applied to independent claims 7 and 12. In particular, none of the references cited disclose, teach, or suggest "an energy management system (EMS) configured to selectively: enable only the first AC motor of the first and second AC motors to operate as a motor to drive the vehicle through the transmission device when the vehicle is cruising; and

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
285 of 584

enable the first AC motor to operate as a motor to drive the vehicle through the transmission device and enable the second AC motor to operate as a motor to drive the vehicle through the power split device when the vehicle is accelerating", as recited in amended claim 7. Further, none of the references cited disclose, teach, or suggest "an energy management system (EMS) configured to: enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising; and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a third mode of operation when the vehicle is in an uphill mode", as recited in amended claim 12. As such, allowance of independent claims 7 and 12 is respectfully requested.

Claims 8-11 and claims 13-17 are dependent upon independent claims 7 and 12, respectively, and are allowable over the cited references for the same reasons provided above.

Based on the amendments present above, reconsideration and withdrawal of the § 103 rejections on claims 1-17 is respectfully requested.

Conclusion

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephonic interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

Should any fees be due, the Commissioner is hereby authorized to charge any fees in connection with this application and to credit any overpayments to Deposit Account No. 50-5522.

Respectfully submitted,
Jian Zhou et al.

By: /Craig M. Drachtman/
Craig M. Drachtman
Registration No. 73,016

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609-454-3500

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
287 of 584

PTO/AIA/26 (04-14)
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 displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 256975-US-11

In re Application of: General Electric Company

Application No.: 16/866,028

Filed: 05-04-2020

For: Electric Drive System and Energy Management Method

The applicant, General Electric Company, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 10,374,529 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 73,016

/Craig M. Drachtman/ — Signature
February 4, 2022 — Date

Craig M. Drachtman — Typed or printed name

Attorney — Title
609-454-3500 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

Electronic Patent Application Fee Transmittal

Application Number:	16866028
Filing Date:	04-May-2020
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Craig Michael Drachtman/Colleen Maroney
Attorney Docket Number:	256975-US-11

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($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
		Total in USD ($)		**170**

Electronic Acknowledgement Receipt

EFS ID:	44918643
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Craig Michael Drachtman/Colleen Maroney
Filer Authorized By:	Craig Michael Drachtman
Attorney Docket Number:	256975-US-11
Receipt Date:	04-FEB-2022
Filing Date:	04-MAY-2020
Time Stamp:	12:41:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$170
RAM confirmation Number	E202224C41492458
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		256975US11_Response.pdf	145941 0d305c51c632408b7e65f48e15a7c2cd018633a6	yes	11
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	11	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	256975US11_TerminalDisclaimer.pdf	121740 3fb56e2786776132703abaec319c1c1afee58831	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37644 eed13066c88fcba65ccd1c0a0e7035127b1041e5	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	305325		

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/866,028	Filing Date 05/04/2020	☐ 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), (i), 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	02/04/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/STEPHEN TYLER HOLLAND/
*** 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.	

This collection of information is required by 37 CFR 1.16. 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 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/866,028 *	16/866,028	Zhou et al.	
	Examiner	Art Unit	
	CHAN, KAWING	2846	

Document Code - DISQ	Internal Document - DO NOT MAIL

TERMINAL DISCLAIMER	☑ APPROVED	☐ DISAPPROVED
Date Filed: **04 February 2022**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/LAWANA R HIXON/

Technology Center: OPLC

Telephone: (571)272-6074

_____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

131278 7590 02/18/2022

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

EXAMINER
CHAN, KAWING

ART UNIT	PAPER NUMBER
2846	

NOTIFICATION DATE	DELIVERY MODE
02/18/2022	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

Office Action Summary	**Application No.** 16/866,028	**Applicant(s)** Zhou et al.	
	Examiner KAWING CHAN	**Art Unit** 2846	**AIA (FITF) Status** No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 02/24/2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☑ Claim(s) 1-17 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, 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.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on ____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq*. for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1-17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1, 3-14 and 16-20 of U.S. Patent No. 10,673,358. Although the claims at issue are not identical, they are not patentably distinct from each other because the scope of the claims are essentially the same.

Claim 1 of the patent discloses claim 1 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 3 of the patent discloses claim 2 of the application.

Claim 4 of the patent discloses claim 3 of the application.

Claim 5 of the patent discloses claim 4 of the application.

Claim 6 of the patent discloses claim 5 of the application.

Claim 7 of the patent discloses claim 6 of the application.

Claim 8 of the patent discloses claim 7 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 10 of the patent discloses claim 8 of the application.

Claim 11 of the patent discloses claim 9 of the application.

Claim 12 of the patent discloses claim 10 of the application.

Claim 13 of the patent discloses claim 11 of the application.

Claim 14 of the patent discloses claim 12 of the application, except drive the vehicle through the transmission device. However, the transmission is coupled to the motors for driving the vehicle; thus, it would have been obvious to one skilled in the art the vehicle is driven by the transmission.

Claim 16 of the patent discloses claim 13 of the application.

Claim 17 of the patent discloses claim 14 of the application.

Claim 18 of the patent discloses claim 15 of the application.

Claim 19 of the patent discloses claim 16 of the application.

Claim 20 of the patent discloses claim 17 of the application.

Claim Rejections - 35 USC § 103

4. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of

rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

5. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-4,7-9 and 12-15 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Iida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1).

Regarding claims 1, 7 and 12, Iida discloses an electric drive system for a vehicle (e.g. Fig. 1), comprising: an energy storage system (ESS) (e.g. Fig .1: BA, BB); a power conversion device (e.g. Fig .1: 12A, 12B, 14, 22) coupled to the ESS; a first electric motor (e.g. MG1) coupled to the power conversion device; a second electric motor (e.g. Fig. 1: MG2) coupled to the power conversion device; a transmission device ([0030]) coupled to the first electric motor; a power split device (Fig. 1: 3 & [0030]) coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets ([0030]); and an energy management system (EMS) (e.g. Fig. 1: 30).

Iida fails to disclose, but Shimizu teaches energy management system configured to: enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising ([0056]: only the motor M2 is driven at a

high speed—cruising); and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating or uphill ([0056]: accelerating or uphill both require higher torque; thus, obvious).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of Iida with the teachings of Shimizu to control only one motor when the vehicle is traveling in high speed (i.e. cruising) and both motors when the vehicle is accelerating so that power of the vehicle can be optimally distributed based on different power requests.

Regarding claims 2, 8 and 13, Iida discloses the ESS comprises a first energy storage unit and a second energy storage unit (e.g. Fig. 1: BA, BB).

Regarding claims 3, 9 and 14, Iida discloses the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor (e.g. [0033, 0037]).

Regarding claims 4 and 15, Iida discloses a first inverter (e.g. Fig .1: 14) coupled between the ESS and the first electric motor and a second inverter (e.g. Fig. 1: 22) coupled between the ESS and the second electric motor.

7. Claims 5, 10 and 16 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Iida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1) as applied to claims 1, 7 and 12, and further in view of King et al. (US 7,595,597 B2).

Regarding claims 5, 10 and 16, lida and Shimizu in combination fails to disclose, but King teaches a pre-charging switching device (Fig. 4: 132).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of lida and Shimizu with the teachings of King to include a pre-charging switching device so as to increase lifespan and reliability of electronic components.

8. Claims 6, 11 and 17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over lida (US 2009/0115375 A1) in view of Shimizu (US 2005/0070401 A1) as applied to claims 1, 7 and 12, and further in view of Aizawa et al. (US 2005/0082992 A1).

Regarding claims 6, 11 and 17, lida and Shimizu in combination fails to disclose, but Aizawa teaches the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising (MG1, MG2 are either not operating or acting as generator as shown in Figs. 9-10).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of lida and Shimizu with the teachings of Aizawa to operate motor as generator so as to efficiently reserve power.

Response to Arguments

9. Applicant's arguments filed 02/04/2022 have been fully considered but they are not persuasive.

10. With respect to amendment of claims 1, 7 and 12, Shimizu (at least in [0056]) teaches only a single motor is driven when the vehicle is traveling in high speed. And,

the examiner is broadly interpreting vehicle traveling in high speed as the claimed "the vehicle is cruising".

11. In addition, with respect to applicant's argument regarding "the Examiner indicated this amendment would be considered allowable subject matter in a teleconference on December 15, 2021", the examiner has sent out an interview summary on 12/24/2021 to indicate update search was performed after the proposed time for the examiner's proposed amendment has passed, and new Office action in view of newly found prior art reference will be issued.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAWING CHAN whose telephone number is (571)270-3909. The examiner can normally be reached Mon-Fri 9am-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 published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KAWING CHAN/
Primary Examiner, Art Unit 2846

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	**Art Unit**
	KAWING CHAN	2846

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	12/18/2021	02/15/2022							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							
	17	✓	✓							

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
306 of 584

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	Art Unit
	KAWING CHAN	2846

CPC - Searched*		
Symbol	**Date**	**Examiner**
h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18	12/18/2021	KC
update search	02/15/2022	KC

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
318	478	12/18/2021	KC
	update search	02/15/2022	KC

* 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**
Assignee and inventor search	12/18/2021	KC
IDS search	12/18/2021	KC
text search	12/18/2021	KC
update search	02/15/2022	KC

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/KAWING CHAN/ Primary Examiner, Art Unit 2846	

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
307 of 584

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"15453218"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 02:28 PM
L2	103	("20090115375"|"6209672"|"8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"8395355"|"8415909"|"8535200"|"5343970"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"20100240491"|"5549172"|"6271648"|"7723932"|"7963353"|"8016061"|"20080197810"|"20130041543"|"6583599"|"7688604"|"7965510"|"20110057588"|"20120091930"|"20120292985"|"6118237"|"6608396"|"7285926"|"7594491"|"7764051"|"20100227722"|"20090224720"|"20090242289"|"6554088"|"8469849").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 02:28 PM
L3	24	("8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"5549172"|"7963353"|"8016061"|"20130041543"|"7688604"|"7965510"|"20100227722"|"20110057588"|"20120091930"|"20120292985"|"7764051"|"20090224720"|"20090242289").PN.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
L4	41	("20090115375"|"6209672"|"8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"8395355"|"8415909"|"8535200"|"5343970"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"20100240491"|"	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM

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L5	17	L4 not L3	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
L6	3871	(("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY")).AANM.	(USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L7	456	(("ZHOU") near3 ("Jian")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L8	110	(("XU") near3 ("Fei")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L9	267	(("LIU") near3 ("Dong")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L10	37	(("QIU") near3 ("Hai")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L11	67	(("KANG") near3 ("Pengju")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L12	42719	energy near10 storage near10 system	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L13	2598	first near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L14	2223	second near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L15	23086	mechanical near5 torque	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:54 PM
L16	1	L12 L13 L14 L15	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:55 PM
L17	10	L13 L14 L15	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:55 PM
L18	5	("20020079178" | "20120190499" | "20130017928" | "6377882" | "8290651").PN. OR ("8636621").URPN.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 03:10 PM
L19	43	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 03:19 PM

		US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did.					
L20	12	L19 and (induction near5 motor)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:19 PM
L21	33	("2010/0222953").URPN.	(USPAT)	SAME	ON	ON	2018/02/03 03:26 PM
L22	5	"20100019729"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:31 PM
L23	6	"20120103749"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:40 PM
L24	3562	(power near5 split) transmission (motor or load or machine)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:32 AM
L25	40108	(planetary) transmission (motor or load or	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2018/09/01 10:33 AM

		machine)	JPO; DERWENT; IBM_TDB)				
L26	41872	L24 or L25	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L27	414	L26 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L28	45	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM
L29	28	L28 and transmission	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM

L30	8	L28 and (cranking and start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:41 PM
L31	2	L28 and (cranking near5 start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:42 PM
L32	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN"	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 01:43 PM
L33	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 01:46 PM
L34	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/09/04 01:46 PM
L35	1322	((cruising or accelerat$3) near10 mode) near50 ((both or second or first) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:38 AM
L36	17	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L37	23	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794" or "20110101915"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L38	4	"2004260904" or "2008312382"	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L39	0	L35 and (L37 or L38)	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L40	56	(US-20130041543-$ or US-20120292985-$ or	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM

		US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L41	4	L35 and L40	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:40 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
313 of 584

L42	710	L35 and (electric near10 vehicle)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:42 AM
L43	39	L42 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:43 AM
L44	1220	first near50 second near50 motor near50 (cruis$3 or accelerat$3) near50 generator	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L45	56	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/24 07:28 AM

		6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L46	1	L44 and L45	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L47	111	L44 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:29 AM
L48	141	L44 and cruis$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L49	6	L48 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L50	7	"14094086"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:51 AM
L51	6276	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:27 AM
L52	8173	(cranking or accelerat$3) near50 (first near10 second near10 (motor or generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L53	642	L51 and L52	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L54	80	L53 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L55	900	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM

L56	2266	(cranking or accelerat$3) near50 (first near10 second near10 (generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L57	87	L55 and L56	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L58	4	"20070007939" or "201000051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L59	10	"20070007939" or "20100051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L60	18739	318/500.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:45 PM
L61	23595	(cruising or (constant near5 speed) or uphill or accelerat$3) near20 ((first or second or mg1 or mg2) near10 (generator or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L62	8783	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L63	181	L62 and L60	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L64	761	L62 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L65	8557	(cranking or accelerat$3 or uphill) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:48 PM
L66	858	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L67	753	L65 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM

L68	24	L66 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L69	3560	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L70	88	L66 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L71	191	L65 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L72	227	L70 or L71	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L73	2	"6691809".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:20 PM
L74	79	"2006042510" or "2000295711" or "2005297729" or "2002078106" or "2000013922" or "2002278105" or "2002067723" or "2002078110" or "2010130828"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:22 PM
L75	49472	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2019/09/27 12:30 AM
L76	1273	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2019/09/27 12:30 AM
L77	1	"16433348"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:30 AM
L78	17234	318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L79	67899	L75 or L76 or L78	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2019/09/27 12:32 AM

			JPO; DERWENT; IBM_TDB)				
L80	3751	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L81	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L82	9461	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L83	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L84	71	L79 and L81	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L85	89	L79 and L80	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L86	217	L79 and L82	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L87	283	L84 or L85 or L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L88	20	"20110074370" or "102010044497"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:16 AM
L89	76	"2117106"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:17 AM
L90	8	"2117106"	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:18 AM
L91	1	"7923866".pn.	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:19 AM
L92	4	"7923866".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:19 AM
L93	13	("6608396" | "6710575"	(US-PGPUB; USPAT;	SAME	ON	ON	2020/01/21

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
318 of 584

		| "7750505" | "7795844" | "7847432").PN. OR ("7923866").URPN.	USOCR)				03:19 AM
L94	947	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:20 AM
L95	9774	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L96	1133	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L97	6	(L94 or L95) and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:22 AM
L98	29710	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 01:49 PM
L99	1668	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2021/12/18 01:49 PM
L100	53077	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2021/12/18 01:49 PM
L101	65	("20100219777"|"20120091930"|"6271648"|"7063637"|"7285926"|"8395355"|"8469849"|"8639423"|"20090015185"|"20040069548"|"20090115375"|"20140152225"|"5343970"|"7583053"|"7595597"|"7923866"|"20030150352"|"20040263099"|"20100051367"|"6118237"|"6554088"|"6691809"|"7207915"|"7723932"|"7839013"|"7963353"|"8138720"|"8387730"|"20050082992"|"20060169548"|"20090224	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:50 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
319 of 584

		720"|"20110111909"|"20120010771"|"20120292985"|"20130041543"|"6209672"|"6608396"|"7594491"|"7688604"|"7965510"|"20060250902"|"20100240491"|"20120010041"|"5549172"|"6583599"|"9145131"|"9108501"|"20080197810"|"20080218104"|"20100019734"|"20100219794"|"20100222953"|"20120103749"|"8535200"|"20070007939"|"20090134820"|"7764051"|"8016061"|"8415909"|"9561719"|"10374529"|"20090242289"|"20100227722"|"20110057588"|"20110101915").PN.					
L102	0	vehicle near50 crusi$3 near50 motor near50 (second) near50 (uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L103	4961	vehicle near50 motor near50 (second) near50 (cruis$3 OR uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L104	229	(98 OR 99 OR 100 OR 101) AND 103	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L105	52	vehicle near50 motor near50 both near50 first near50 (second) near50 ((cruis$3 OR uphill OR accelerat$3) near10 (mode OR state OR condition OR status))	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:57 PM
L106	78	((US-20120103749-A1 OR US-20190288616-A1 OR US-20090134820-A1 OR US-20100219777-A1 OR US-20050082992-A1 OR US-20130041543-A1 OR US-20100019729-A1 OR US-20140152225-A1 OR US-20170174098-A1 OR US-20090115375-A1 OR US-20050070401-A1 OR US-20100219794-A1 OR US-20110101915-A1 OR US-20060169548-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
320 of 584

		A1 OR US-20040069548-A1 OR US-20030150352-A1 OR US-20100051367-A1 OR US-20070007939-A1 OR US-20040263099-A1 OR US-20120292985-A1 OR US-20120091930-A1 OR US-20120010771-A1 OR US-20120010041-A1 OR US-20110057588-A1 OR US-20100227722-A1 OR US-20100222953-A1 OR US-20090242289-A1 OR US-20090224720-A1 OR US-20080218104-A1 OR US-20110111909-A1 OR US-20100240491-A1 OR US-20100019734-A1 OR US-20080197810-A1 OR US-20090015185-A1 OR US-20060250902-A1).did. AND PGPB.dbnm.) OR ((US-10374529-B2 OR US-7923866-B2 OR US-10291158-B2 OR US-8630761-B2 OR US-5343970-A OR US-7595597-B2 OR US-8016061-B2 OR US-7965510-B2 OR US-6608396-B2 OR US-5549172-A OR US-6554088-B2 OR US-7688604-B2 OR US-9561719-B2 OR US-8387730-B2 OR US-7583053-B2 OR US-6691809-B2 OR US-9145131-B2 OR US-8138720-B2 OR US-8639423-B2 OR US-7963353-B2 OR US-7839013-B2 OR US-7764051-B2 OR US-9108501-B2 OR US-8535200-B2 OR US-8469849-B2 OR US-8415909-B2 OR US-8395355-B2 OR US-7723932-B2 OR US-					

		7594491-B2 OR US-7207915-B2 OR US-7285926-B2 OR US-7063637-B2 OR US-6583599-B1 OR US-6271648-B1 OR US-6118237-A OR US-6209672-B1).did. AND USPT.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A).did. AND JPAB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A OR DE-102010044497-A1).did. AND DWPI.dbnm.) OR ((KR-20110074370-A).did. AND FPRS.dbnm.) OR ((EP-2117106-A1).did. AND EPAB.dbnm.)					
L107	7	106 AND uphill	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM
L108	3	"16433348"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 03:00 PM
L109	19	"10374529"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR,	SAME	ON	ON	2021/12/18 03:22 PM

			HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L110	44064	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:18 PM
L111	78	((US-10374529-B2 OR US-8016061-B2 OR US-7595597-B2 OR US-5343970-A OR US-8630761-B2 OR US-10291158-B2 OR US-7923866-B2 OR US-7965510-B2 OR US-6608396-B2 OR US-5549172-A OR US-6554088-B2 OR US-7583053-B2 OR US-9145131-B2 OR US-8138720-B2 OR US-8639423-B2 OR US-7963353-B2 OR US-7839013-B2 OR US-7764051-B2 OR US-7688604-B2 OR US-9561719-B2 OR US-8387730-B2 OR US-6691809-B2 OR US-9108501-B2 OR US-8535200-B2 OR US-8469849-B2 OR US-8415909-B2 OR US-8395355-B2 OR US-7723932-B2 OR US-7594491-B2 OR US-7207915-B2 OR US-7285926-B2 OR US-7063637-B2 OR US-6583599-B1 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:18 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
323 of 584

		6271648-B1 OR US-6118237-A OR US-6209672-B1).did. AND USPT.dbnm.) OR ((US-20130041543-A1 OR US-20090115375-A1 OR US-20170174098-A1 OR US-20140152225-A1 OR US-20100019729-A1 OR US-20120103749-A1 OR US-20050082992-A1 OR US-20100219777-A1 OR US-20090134820-A1 OR US-20190288616-A1 OR US-20050070401-A1 OR US-20040263099-A1 OR US-20120091930-A1 OR US-20120010771-A1 OR US-20120010041-A1 OR US-20110057588-A1 OR US-20100227722-A1 OR US-20100222953-A1 OR US-20090224720-A1 OR US-20080218104-A1 OR US-20030150352-A1 OR US-20090242289-A1 OR US-20100219794-A1 OR US-20110101915-A1 OR US-20060169548-A1 OR US-20040069548-A1 OR US-20120292985-A1 OR US-20100051367-A1 OR US-20070007939-A1 OR US-20110111909-A1 OR US-20100240491-A1 OR US-20100019734-A1 OR US-20080197810-A1 OR US-20090015185-A1 OR US-20060250902-A1).did. AND PGPB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A).did. AND JPAB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A OR DE-102010044497-					

		A1).did. AND DWPI.dbnm.) OR ((KR-20110074370-A).did. AND FPRS.dbnm.) OR ((EP-2117106-A1).did. AND EPAB.dbnm.)					
L112	773	(6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 110 OR 111) AND 103	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:19 PM
L113	225	(6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 110 OR 111) AND 103	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2022/02/15 12:20 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N98	5735	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N99	733	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N100	305	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:21 AM
N101	5	(N98 or N99) and N100	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N102	376	N98 and N99	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N103	5383	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N104	53	N102 and N103	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM

N105	2001	((cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N106	146	((cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N107	298	(N105 or N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM
N108	7	(N105 and N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Jian ZHOU et al. **Application No.:** 16/866,028 **Confirmation No.:** 1053 **Filed:** May 4, 2020 **For:** ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD **Group:** 2846 **Examiner:** Kawing CHAN	**Our File:** 256975-US-11 **Date:** April 8, 2022

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY PURSUANT TO 37 C.F.R. §1.116 (RESPONSE AFTER FINAL)
FOR AFTER FINAL CONSIDERATION PILOT 2.0
(FILED CURRENTLY WITH FORM PTO/SB/434)

Dear Examiner:

This After Final reply is timely filed in response to the Final Office Action dated 02/18/2022 and is also concurrently filed with a Request for Consideration under After Final Consideration Pilot (AFCP) 2.0 (Form PTO/SB/434). Please kindly reconsider the application as follows:

Listing and Amendments of the Claims begin on page 2 of this paper.
Remarks begin on page 7 of this paper.

Please charge any fee due or credit any overpayment in connection with this reply or this application to Deposit Account 50-5522.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Listing and Amendments of the Claims begin on page 2 of this paper.
Remarks begin on page 7 of this paper.

Please charge any fee due or credit any overpayment in connection with this reply or this application to Deposit Account 50-5522.

Listing and Amendments of the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising;

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a second mode of operation when the vehicle is starting; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a third ~~second~~ mode of operation when the vehicle is accelerating.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
329 of 584

2. (Original) The drive system of claim 1, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

3. (Original) The drive system of claim 2, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

4. (Original) The drive system of claim 1, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

5. (Original) The drive system of claim 1, further comprising a pre-charging switching device.

6. (Original) The drive system of claim 1, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

7. (Currently Amended) An electric drive system for a vehicle, comprising:
an energy storage system (ESS);
a power conversion device coupled to the ESS;
a first inverter coupled to the power conversion device;
a first AC motor coupled to the first inverter;
a second inverter coupled to the power conversion device;
a second AC motor coupled to the second inverter;
a transmission device coupled to the first AC motor;
a power split device coupled to the transmission device and the second

AC motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to selectively:

enable only the first AC motor of the first and second AC motors to operate as a motor to drive the vehicle through the transmission device when the vehicle is cruising;

enable only the first AC motor of the first and second AC motors to operate as a motor to drive the vehicle through the transmission device when the vehicle is starting; and

enable the first AC motor to operate as a motor to drive the vehicle through the transmission device and enable the second AC motor to operate as a motor to drive the vehicle through the power split device when the vehicle is accelerating.

8. (Original) The electric drive system of claim 7, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

9. (Original) The drive system of claim 8, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

10. (Original) The electric drive system of claim 7, further comprising a pre-charging switching device.

11. (Original) The electric drive system of claim 7, wherein the EMS is further configured to enable the second AC motor to operate as a generator when the vehicle is cruising.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
331 of 584

12. (Currently Amended) A drive system for a vehicle, comprising:

an energy storage system (ESS);

a power conversion device coupled to the ESS;

a first electric motor coupled to the power conversion device;

a second electric motor coupled to the power conversion device;

a transmission device coupled to the first electric motor;

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising;

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a second mode of operation when the vehicle is starting; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a third mode of operation when the vehicle is in an uphill mode.

13. (Original) The drive system of claim 12, wherein the ESS comprises a first energy storage unit and a second energy storage unit.

14. (Original) The drive system of claim 13, wherein the first energy storage unit comprises a battery and the second energy storage unit comprises an ultra-capacitor.

15. (Original) The drive system of claim 12, further comprising a first inverter coupled between the ESS and the first electric motor and a second inverter coupled between the ESS and the second electric motor.

16. (Original) The drive system of claim 12, further comprising a pre-charging switching device.

17. (Original) The drive system of claim 12, wherein the EMS is further configured to enable the second electric motor to operate as a generator in the first mode of operation when the vehicle is cruising.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
333 of 584

REMARKS/ARGUMENTS

In the current Final Office Action dated 02/18/2022, claims 1-17 are pending. In this reply, while Applicant still respectfully disagrees with the claim rejections and the reasoning for the combination of references as to be discussed below, Applicant has nevertheless amended independent claims 1, 7 and 12 in order to further the prosecution. Support for the amendments is found in the patent application as filed, at least in Fig. 7; paragraphs [0056]; [0074]; [0079] of the published patent application). Therefore, no new matter has been added.

Accordingly, after the entry of this reply, claims 1-17 remain under consideration in this application.

Double Patenting

Claims 1-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-14, and 16-20 of US 10,673,358. Without agreeing to the rejections, in order to further the prosecution, a Terminal Disclaimer is submitted herewith to overcome the obviousness-type double patenting rejections.

A Terminal Disclaimer was also submitted earlier on December 20, 2021, but due to an inadvertent clerical error, was not approved. Applicant's undersigned attorney apologizes to the Examiner for any confusion or difficulty resulting from that submission.

Based on at least the foregoing reasons, Applicant respectfully requests the reconsideration and the withdrawal of the above double patenting rejections.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
334 of 584

Claim Rejections – 35 USC §103

Claims 1-4, 7-9, and 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iida (US 2009/0115375) in view of Shimizu (US 2005/0070401). Claims 5, 10, and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iida in view of Shimizu and King (US 7,595,597). Claims 6, 11, and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iida in view of Shimizu and Aizawa (US 2005/0082992). Applicant hereby respectfully disagrees with these 35 U.S.C. §103 rejections and the reasons given for them as explained below. However, to advance the prosecution, independent claim 1, 7 and 12 have been amended as also explained below.

Applicant respectfully submits that the above cited references, either alone or in combination, do not teach or suggest each and every element of even the independent claims 1, 7 and 12 as presently written, let alone any of their dependent claims which comprises additional distinguishing features. The failure of an asserted combination to teach or suggest each and every feature of a claim is fatal to an obviousness rejection under 35 U.S.C. §103.

In the current Final Office Action, as to independent claims 1, 7 and 12, the Examiner states that:

Regarding claims 1, 7 and 12, Iida discloses an electric drive system for a vehicle (e.g. Fig. 1), comprising: an energy storage system (ESS) (e.g. Fig .1: 8A, 8B); a power conversion device (e.g. Fig .1: 12A, 12B, 14, 22) coupled to the ESS; a first electric motor (e.g. MG1) coupled to the power conversion device; a second electric motor (e.g. Fig. 1: MG2) coupled to the power conversion device; a transmission device ([0030]) coupled to the first electric motor; a power split device (Fig. 1: 3 & [0030]) coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets ([0030]); and an energy management system (EMS) (e.g. Fig. 1: 30).

Iida fails to disclose, but Shimizu teaches energy management system configured to: enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising ([0056]: only the motor M2 is driven at a high speed—cruising); and enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating or uphill ([0056]: accelerating or uphill both require higher torque; thus, obvious).

Thus, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified the teachings of Iida with the teachings of Shimizu to control only one motor when the vehicle is traveling in high speed (i.e. cruising) and both motors when the vehicle is accelerating so that power of the vehicle can be optimally distributed based on different power requests.

Applicant's Comments Regarding the Combination of References

Applicant respectfully disagrees with the reasoning for the suggested combination of references provided in the Office Action. Applicant respectfully submits that Shimizu at least does not disclose or remotely suggest having "a power split device comprising one or more planetary sets" as claimed. Furthermore, how the power split device of Iida could be modified to enable the second motor (MG1) coupled to the power split device of Iida to drive the vehicle and still accomplish the other functions described in Iida is not disclosed or suggested in either reference. In that respect, it is well understood in the art that the gear pair (21) as disclosed in Shimizu is significantly different than the power split device (3) disclosed in Iida. Therefore, one skilled in the art would not be motivated or know how to utilize the teaching of Shimizu to modify the Iida's system in order to arrive at the present claimed invention. Accordingly, the suggested combination of Iida and Shimizu by the Examiner is an impermissible hindsight reconstruction of the cited references.

Applicant's Comments Concerning Independent Claims 1, 7 and 12 as Presently Written

Independent claims 1, 7 and 12 have been amended to further the prosecution. For example, independent claim 1 as presently written, currently recites (emphasis added):

1. A drive system for a vehicle, comprising:
an energy storage system (ESS);
a power conversion device coupled to the ESS;
a first electric motor coupled to the power conversion device;
a second electric motor coupled to the power conversion device;
a transmission device coupled to the first electric motor;

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
337 of 584

a power split device coupled to the transmission device and the second electric motor, the power split device comprising one or more planetary sets; and

an energy management system (EMS) configured to:

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a first mode of operation when the vehicle is cruising;

enable only the first electric motor of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device in a second mode of operation when the vehicle is starting; and

enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a third mode of operation when the vehicle is accelerating.

In the current Final Office Action, the Examiner relied specifically on the only embodiment of Shimizu that discloses two motors (M1 and M2) concurrently driving the vehicle (e.g., paragraph [0056] described with respect to the Fig. 4 of Shimizu), in order to suggest that the Shimizu teaches "…enable the first electric motor to operate as a motor to drive the vehicle through the transmission device and enable the second electric motor to operate as a motor to drive the vehicle through the power split device in a second mode of operation when the vehicle is accelerating", as recited in previous independent claim 1. This is due to the fact that all other figures and embodiments of Shimizu relate to only when one motor is on and the other is off and therefore would not be applicable.

Again, the Office Action specifically relies on paragraph [0056] of Shimizu which states (emphasis added) "… as seen in FIG. 4 … **both of the first motor M1**

and the second motor M2 are preferably driven to achieve powerful acceleration <u>when the vehicle is starting to move from a stopped condition</u>", to support the position taken by the Examiner that both motors are required "when the vehicle is accelerating or uphill ([0056]: accelerating or uphill both require higher torque…"

Accordingly, independent claim 1 as presently written now recites that the "energy management system (EMS) configured to…enable **only the first electric motor** of the first and second electric motors to operate as a motor to drive the vehicle through the transmission device **in a second mode of operation when the vehicle is starting**." Therefore, the required operation of Shimizu to support the previous rejection is clearly opposite to the currently recited feature of independent claim 1 as presently written.

Accordingly, based on at least the foregoing reasons, Applicant respectfully submits that independent claim 1 as presently written is patentable over the cited references, because the cited references, either relied alone or in combination, do not disclose or suggest all of its recited features. Likewise, independent claims 7 and 12 are also patentable over the cited references for at least the same reasons. Similarly, current dependent claims 2-6; 8-11 and 13-17 which depend respectively from base independent claim 1, 7 or 12, and comprise additional distinguishing features, are also patentable over the cited references for at least the same reasons. Accordingly, Applicant respectfully requests the reconsideration and the withdrawal of the above 35 USC §103 claim rejections.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
339 of 584

Conclusion

In view of the above, Applicant respectfully submits that all of the present claims are patentable over the cited references of record, and therefore, requests the allowance of the present application. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the undersigned so that any remaining issues may be resolved.

Respectfully submitted,

By: /Frank Y. Liao/_____
Frank Y. Liao
Attorney for Applicant
Registration No. 40,065

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609-454-3500

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
340 of 584

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
256975-US-11	16/866,028	05/04/2020
First Named Inventor:	**Title:**	
Jian ZHOU	ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:

- Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
- The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
  - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
  - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
    - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
    - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Frank Y. Liao/	April 8, 2022
Name (Print/Typed)	**Practitioner Registration No.**
Frank Y. Liao	40,065

***Note**: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

[✓] * Total of 1 forms are submitted.

PTO/AIA/26 (04-14)
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 displays a valid OMB control number.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 256975-US-11

In re Application of: General Electric Company

Application No.: 16/866,028

Filed: 05-04-2020

For: ELECTRIC DRIVE SYSEM AND ENERGY MANAGEMENT METHOD

The applicant, General Electric Company, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 10,673,358 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 40,065

/Frank Y. Liao/ — Signature
April 8, 2022 — Date

Frank Y. Liao — Typed or printed name

Attorney — Title
609-454-3500 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

Electronic Patent Application Fee Transmittal

Application Number:	16866028
Filing Date:	04-May-2020
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Frank Y. Liao/Colleen Maroney
Attorney Docket Number:	256975-US-11

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($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
		Total in USD ($)		**170**

Electronic Acknowledgement Receipt

EFS ID:	45427743
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Frank Y. Liao/Colleen Maroney
Filer Authorized By:	Frank Y. Liao
Attorney Docket Number:	256975-US-11
Receipt Date:	08-APR-2022
Filing Date:	04-MAY-2020
Time Stamp:	10:42:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$170
RAM confirmation Number	E202248A43061808
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		256975US11_AFResponse.pdf	486299 03e32c3c39c17749bd5f49c75f7d9fc5f15f46bf	yes	13
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Response After Final Action		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	13	
Warnings:					
Information:					
2	After Final Consideration Program Request	256975US11_AFCP2.pdf	138997 70e17f5d131483a66fb824171d356f62d21db64e	no	1
Warnings:					
Information:					
3	Terminal Disclaimer Filed	256975US11_TerminalDisclaimer.pdf	121620 5ec86f16edcb745a91d9da6dec7e7d4835f16c30	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	37725 51ff150b49de4c5ca0aa76d3c3db22135c1302dc	no	2
Warnings:					
Information:					
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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/866,028	Filing Date 05/04/2020	☐ 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), (i), 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	04/08/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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".	/JERMAINE D MINOR/
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Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/866,028 *	16/866,028	Zhou et al.	
	Examiner	Art Unit	
	CHAN, KAWING	2846	

Document Code - DISQ	Internal Document - DO NOT MAIL

TERMINAL DISCLAIMER	☑ APPROVED	☐ DISAPPROVED
Date Filed: 08 April 2022	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

/JEAN PROCTOR/

Technology Center: OPLC

Telephone: (571)272-1040

_____

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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	1	H11-208297	JP	A	1999-08-03	Honda Motor CO LTD		X

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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Examiner Signature		Date Considered	

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[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	16866028
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	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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	/Frank Y.Liao/	Date (YYYY-MM-DD)	2022-04-12
Name/Print	Frank Y. Liao	Registration Number	40,065

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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.

(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

特開平11－208297

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(51)Int.Cl.[6]	識別記号	ＦＩ	
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Ｂ６０Ｌ	11/14	Ｂ６０Ｌ	11/14
Ｆ０２Ｄ	29/02	Ｆ０２Ｄ	29/02　Ｄ

審査請求　未請求　請求項の数５　ＯＬ　（全８頁）

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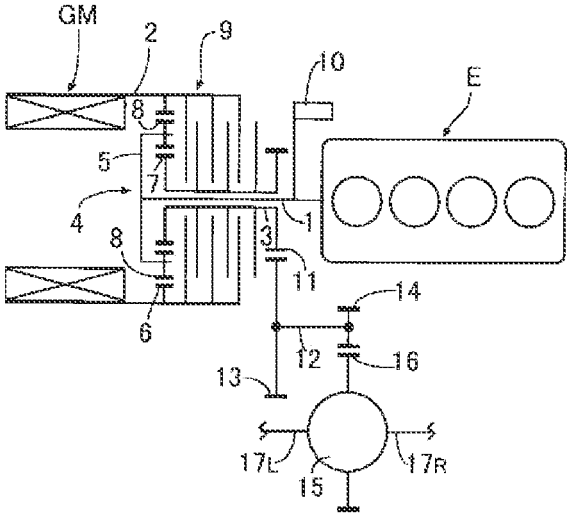
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(54)【発明の名称】　ハイブリッド車両

(57)【要約】

【課題】　走行用の動力源として内燃機関および発電電動機を備えたハイブリッド車両において、内燃機関の駆動力による急発進性能や急加速性能を高める。

【解決手段】　内燃機関Ｅ、発電電動機ＧＭおよび駆動輪間で駆動力の伝達および配分を行う遊星歯車機構４は、内燃機関出力部材１に接続されたプラネタリキャリヤ５と、発電電動機出力部材２に接続されたリングギヤ６と、駆動輪に連なる駆動力出力部材３に接続されたサンギヤ７とを備える。車両の急発進時および急加速時に、クラッチ９を締結して遊星歯車機構４の差動を規制することにより、内燃機関出力部材１、発電電動機出力部材２および駆動力出力部材３を一体化して内燃機関Ｅの駆動力を直接駆動力出力部材３に伝達できるようにする。



【特許請求の範囲】
【請求項１】　内燃機関（Ｅ）に接続された内燃機関出力部材（１）と、発電電動機（ＧＭ）に接続された発電電動機出力部材（２）と、駆動輪（W_{FL}，W_{FR}）に接続された駆動力出力部材（３）との間で駆動力の伝達および配分を行う動力伝達手段（４）を備えてなり、内燃機関出力部材（１）あるいは発電電動機出力部材（２）の回転を駆動力出力部材（３）に伝達して走行するとともに、内燃機関出力部材（１）あるいは駆動力出力部材（３）の回転を発電電動機出力部材（２）に伝達して発電を行うハイブリッド車両において、
内燃機関出力部材（１）を駆動力出力部材（３）に結合し得るクラッチ（９）を備えたことを特徴とするハイブリッド車両。
【請求項２】　内燃機関（Ｅ）で主駆動輪（W_{FL}，W_{FR}）を駆動するとともに、発電電動機（ＧＭ）で発電した電力で副駆動輪（W_{RL}，W_{RR}）を駆動することを特徴とする、請求項１に記載のハイブリッド車両。
【請求項３】　左右の副駆動輪（W_{RL}，W_{RR}）をそれぞれ駆動する左右の電動機（GM_L，GM_R）を備えたことを特徴とする、請求項２に記載のハイブリッド車両。
【請求項４】　後進走行時に内燃機関出力部材（１）の回転を規制するロック手段（１０）を備えたことを特徴とする、請求項１に記載のハイブリッド車両。
【請求項５】　前記動力伝達手段（４）が遊星歯車機構であり、そのプラネタリキャリヤ（５）、リングギヤ（６）およびサンギヤ（７）が、前記内燃機関出力部材（１）、発電電動機出力部材（２）および駆動力出力部材（３）の何れかにそれぞれ接続されたことを特徴とする、請求項１に記載のハイブリッド車両。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、走行用の動力源として内燃機関および発電電動機を備えたハイブリッド車両に関する。
【０００２】
【従来の技術】かかるハイブリッド車両は、例えば特開平９－１７５２０３号公報により既に知られている。上記ハイブリッド車両は動力伝達手段に遊星歯車機構を用いており、プラネタリキャリヤが内燃機関に接続され、サンギヤが発電電動機に接続され、リングギヤが駆動輪に接続されている。そして内燃機関あるいは発電電動機の回転を駆動輪に伝達して走行するとともに、内燃機関あるいは駆動輪の回転を発電電動機に伝達して発電を行うようになっている。
【０００３】
【発明が解決しようとする課題】ところで上記従来のものは、急発進や急加速を行おうとして内燃機関を駆動したとき、内燃機関の駆動力が遊星歯車機構を介して駆動輪および発電電動機に配分されてしまい、しかも駆動力の配分量が駆動輪に比べて負荷の小さい発電電動機側に多くなるため、内燃機関の駆動力を駆動輪に充分に伝達することができず、急発進性能や急加速性能を高めることが難しいという問題がある。
【０００４】本発明は前述の事情に鑑みてなされたもので、走行用の動力源として内燃機関および発電電動機を備えたハイブリッド車両において、内燃機関の駆動力による急発進性能や急加速性能を高めることを目的とする。
【０００５】
【課題を解決するための手段】前記目的を達成するために、請求項１に記載された発明は、内燃機関に接続された内燃機関出力部材と、発電電動機に接続された発電電動機出力部材と、駆動輪に接続された駆動力出力部材との間で駆動力の伝達および配分を行う動力伝達手段を備えてなり、内燃機関出力部材あるいは発電電動機出力部材の回転を駆動力出力部材に伝達して走行するとともに、内燃機関出力部材あるいは駆動力出力部材の回転を発電電動機出力部材に伝達して発電を行うハイブリッド車両において、内燃機関出力部材を駆動力出力部材に結合し得るクラッチを備えたことを特徴とする。
【０００６】上記構成によれば、クラッチで内燃機関出力部材を駆動力出力部材に結合した状態で内燃機関を駆動すると、内燃機関の駆動力を直接駆動輪に伝達することが可能になって急発進性能や急加速性能が向上する。
【０００７】また請求項２に記載された発明は、請求項１の構成に加えて、内燃機関で主駆動輪を駆動するとともに、発電電動機で発電した電力で副駆動輪を駆動することを特徴とする。
【０００８】上記構成によれば、内燃機関で主駆動輪および発電電動機を駆動し、発電電動機で発電した電力で副駆動輪を駆動するので、簡単な構造で４輪駆動を実現することができる。
【０００９】また請求項３に記載された発明は、請求項２の構成に加えて、左右の副駆動輪をそれぞれ駆動する左右の電動機を備えたことを特徴とする。
【００１０】上記構成によれば、左右の電動機で左右の副駆動輪をそれぞれ駆動することにより、左右の副駆動輪に異なる駆動力を配分して車両のヨーモーメントを制御することができる。
【００１１】また請求項４に記載された発明は、請求項１の構成に加えて、後進走行時に内燃機関出力部材の回転を規制するロック手段を備えたことを特徴とする。
【００１２】上記構成によれば、発電電動機を駆動して車両を後進走行させるときにロック手段で内燃機関出力部材の回転を規制することにより、内燃機関が逆転駆動されるのを未然に防止することができる。
【００１３】また請求項５に記載された発明は、請求項１の構成に加えて、前記動力伝達手段が遊星歯車機構であり、そのプラネタリキャリヤ、リングギヤおよびサン

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
355 of 584

ギヤが、前記内燃機関出力部材、発電電動機出力部材および駆動力出力部材の何れかにそれぞれ接続されたことを特徴とする。

【００１４】上記構成によれば、動力伝達手段として遊星歯車機構を用いることにより、内燃機関出力部材、発電電動機出力部材および駆動力出力部材間での駆動力の伝達および配分を簡単な構造で行うことができる。

【００１５】

【発明の実施の形態】以下、本発明の実施の形態を、添付図面に示した本発明の実施例に基づいて説明する。

【００１６】図１および図２は本発明の第１実施例を示すもので、図１はハイブリッド車両の全体構成図、図２はハイブリッド車両のパワーユニットのスケルトン図である。

【００１７】図１に示すように、４輪駆動のハイブリッド車両は主駆動輪たる左右の前輪W_{FL}，W_{FR}と副駆動輪たる左右の後輪W_{RL}，W_{RR}とを備えており、左右の前輪W_{FL}，W_{FR}は内燃機関Ｅおよび第１発電電動機ＧＭにより駆動され、左右の後輪W_{RL}，W_{RR}はそれぞれ左右の第２発電電動機GM_L，GM_Rにより駆動される。第１発電電動機ＧＭおよび左右の第２発電電動機GM_L，GM_Rは、いずれも電動機として機能して駆動力を発生するとともに、発電機として機能して回生制動力を発生しながら発電を行う。

【００１８】図２を併せて参照すると明らかなように、内燃機関Ｅのクランク軸に接続された軸状の内燃機関出力部材１の外周に、第１発電電動機ＧＭのロータに接続された環状の発電電動機出力部材２と、前輪W_{FL}，W_{FR}に接続された筒状の駆動力出力部材３とが同軸に配置されており、内燃機関出力部材１、発電電動機出力部材２および駆動力出力部材３は動力伝達手段としての遊星歯車機構４を介して相互に接続される。遊星歯車機構４はプラネタリキャリヤ５と、リングギヤ６と、サンギヤ７と、プラネタリキャリヤ５に支持されてリングギヤ６およびサンギヤ７に噛合する複数のプラネタリギヤ８とを備えており、プラネタリキャリヤ５は内燃機関出力部材１に固定され、リングギヤ６は発電電動機出力部材２に固定され、サンギヤ７は駆動力出力部材３に固定される。

【００１９】発電電動機出力部材２および駆動力出力部材３は湿式多板型のクラッチ９により一体に結合可能である。また内燃機関出力部材１と図示せぬケーシングとの間には、内燃機関Ｅがその回転方向と逆方向に回転するのを規制すべく、電磁クラッチよりなるロック手段１０が設けられる。駆動力出力部材３に設けたファイナルドライブギヤ１１が中間軸１２に設けた第１中間ギヤ１３に噛合し、中間軸１２に設けた第２中間ギヤ１４がディファレンシャル１５に設けたファイナルドリブンギヤ１６に噛合する。ディファレンシャル１５は左右の前輪駆動軸17_L，17_Rを介して左右の前輪W_{FL}，W_{FR}に接続される。

【００２０】左右の第２発電電動機GM_L，GM_Rは、それぞれ遊星歯車式の左右の減速機18_L，18_Rおよび左右の後輪駆動軸19_L，19_Rを介して左右の後輪W_{RL}，W_{RR}に接続される。減速機18_L，18_Rは、サンギヤが第２発電電動機GM_L，GM_Rに接続され、プラネタリキャリヤが後輪駆動軸19_L，19_Rに接続され、リングギヤが図示せぬケーシングに回転不能に固定される。

【００２１】第１発電電動機ＧＭおよび左右の第２発電電動機GM_L，GM_Rとバッテリ２０とが、インバータよりなるＰＤＵ２１（パワードライブユニット）を介して接続される。ＰＤＵ２１はバッテリ２０による第１発電電動機ＧＭおよび第２発電電動機GM_L，GM_Rの駆動と、第１発電電動機ＧＭおよび第２発電電動機GM_L，GM_Rの回生によるバッテリ２０の充電とを制御する。

【００２２】次に、前述の構成を備えた本発明の実施例の作用を説明する。

発進時

クラッチ９を締結して遊星歯車機構４のリングギヤ６およびサンギヤ７を一体に結合することにより、内燃機関出力部材１、発電電動機出力部材２および駆動力出力部材３を一体化した状態で第１発電電動機ＧＭを駆動する。その結果、第１発電電動機ＧＭの発電電動機出力部材２の回転はクラッチ９を介して駆動力出力部材３に伝達され、駆動力出力部材の３の回転はファイナルドライブギヤ１１、第１中間ギヤ１３、中間軸１２、第２中間ギヤ１４、ファイナルドリブンギヤ１６、ディファレンシャル１５および前輪駆動軸17_L，17_Rを介して左右の前輪W_{FL}，W_{FR}に伝達される。このとき、回転する内燃機関出力部材１により内燃機関Ｅが強制的に駆動されるが、内燃機関Ｅは弁休止機構によりポンピングロスが発生しないように制御されて無負荷で空転する。また左右の後輪W_{RL}，W_{RR}は、バッテリ２０から給電される左右の第２発電電動機GM_L，GM_Rにより駆動される。

【００２３】このように、内燃機関Ｅに比べて低速トルクの大きい第１発電電動機ＧＭおよび左右の第２発電電動機GM_L，GM_Rによって車両の発進を行うので、スムーズな発進が可能になる。

【００２４】車両の発進時にバッテリ２０の残容量が充分でない場合には、クラッチ９の締結を解除して遊星歯車機構４のリングギヤ６およびサンギヤ７を切り離した状態で内燃機関Ｅを駆動する。その結果、内燃機関Ｅに接続された内燃機関出力部材１のトルクは遊星歯車機構４を介して発電電動機出力部材２および駆動力出力部材３に配分される。即ち、内燃機関出力部材１と一体のプラネタリキャリヤ５が回転すると、リングギヤ６に接続された第１発電電動機ＧＭとサンギヤ７に接続された駆

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
356 of 584

動力出力部材３とが、それらの負荷に応じた回転数で回転する。而して、駆動力出力部材３に接続された前輪W_{FL}，W_{FR}が駆動されて車両は発進し、また第１発電電動機ＧＭが発電した電力でバッテリ２０が充電されるとともに、該電力で左右の第２発電電動機GM_L，GM_Rが駆動されて車両の発進をアシストすべく後輪W_{RL}，W_{RR}が駆動される。

【００２５】内燃機関Ｅから前輪W_{FL}，W_{FR}に伝達される駆動力が不足する場合には、クラッチ９を所定の締結力で締結して遊星歯車機構４の差動を制限することにより、前輪W_{FL}，W_{FR}に伝達される駆動力を増加させることができる。

【００２６】第１発電電動機ＧＭで前輪W_{FL}，W_{FR}を駆動して発進を行った場合には、車速が所定値に達した時点で、燃料噴射を開始して空転している内燃機関Ｅを始動し、これと同時に第１発電電動機ＧＭの駆動を停止するとともにクラッチ９の締結を解除する。その結果、上述した内燃機関Ｅによる発進時と同様に、内燃機関Ｅの駆動力が前輪W_{FL}，W_{FR}に伝達されるようになる。

通常走行時

車両の通常走行時には、内燃機関Ｅの出力の増加に伴って第１発電電動機ＧＭの負荷を調整することにより、内燃機関Ｅから前輪W_{FL}，W_{FR}に伝達される駆動力を制御するとともに、第１発電電動機ＧＭが発電した電力で左右の第２発電電動機GM_L，GM_Rを駆動して車両の加速をアシストする。また左右の第２発電電動機GM_L，GM_Rの駆動力に差を持たせることにより、車両のヨーモーメントを制御して旋回性能や直進安定性能を高めることができる。この場合、左右の第２発電電動機GM_L，GM_Rの一方を駆動して他方を回生することも可能である。

クルーズ時

車両のクルーズ時には、左右の第２発電電動機GM_L，GM_Rによるアシストを中止して、内燃機関Ｅの駆動力のみで走行する。このとき、第１発電電動機ＧＭあるいは左右の第２発電電動機GM_L，GM_Rをオルタネータとして機能させ、それが発電した電力で１２ボルトの補機用バッテリを充電する。

急発進時および急加速時

大きな駆動力を必要とする急発進および急加速は、第１発電電動機ＧＭよりも大きな駆動力を発生し得る内燃機関Ｅにより行われる。仮に、クラッチ９の締結を解除した状態で内燃機関Ｅを駆動すると、その駆動力は遊星歯車機構４により発電電動機出力部材２および駆動力出力部材３に配分されるが、第１発電電動機ＧＭの負荷は前輪W_{FL}，W_{FR}の負荷に比べて小さいため、駆動力の大部分が第１発電電動機ＧＭに配分されて前輪W_{FL}，W_{FR}を効果的に駆動することができず、急発進や急加速を行うことができない。

【００２７】そのために、急発進時および急加速時には、クラッチ９を締結した状態で内燃機関Ｅを駆動する。而して、クラッチ９の締結により内燃機関出力部材１、発電電動機出力部材２および駆動力出力部材３が一体化されるため、内燃機関Ｅの大きな駆動力を直接前輪W_{FL}，W_{FR}に伝達して車両の急発進性能および急加速性能を高めることができる。このとき、左右の第２発電電動機GM_L，GM_Rを駆動することにより、急発進性能および急加速性能を更に高めることができる。

後進走行時

車両の後進走行時には、内燃機関Ｅを停止させ、クラッチ９を締結解除して遊星歯車機構４のリングギヤ６およびサンギヤ７を切り離し、更に電磁クラッチより成るロック手段１０を作動させて内燃機関出力部材１の回転を規制した状態で、第１発電電動機ＧＭを正転方向（前進方向）に駆動する。このとき、内燃機関出力部材１と一体のプラネタリキャリヤ５の回転が規制されているため、発電電動機出力部材２と一体のリングギヤ６の回転がプラネタリギヤ８およびサンギヤ７を介して駆動力出力部材３を逆転駆動し、車両を後進走行させる。これと同時に、バッテリ９からの電力で左右の第２発電電動機GM_L，GM_Rが逆転駆動され、第１発電電動機ＧＭをアシストする。

制動時

車両の制動時には、内燃機関Ｅをフュエルカットして無負荷状態にした上で、クラッチ９を締結して前輪W_{FL}，W_{FR}の回転を第１発電電動機ＧＭに逆伝達することにより、第１発電電動機ＧＭに回生制動力を発生させる。発生した回生電力はバッテリ９の充電に供される。また後輪W_{RL}，W_{RR}の回転を左右の第２発電電動機GM_L，GM_Rに逆伝達して回生制動力を発生させ、発生した回生電力でバッテリ９を充電する。

【００２８】次に、図３～図９に基づいて本発明の第２～第８実施例を説明する。尚、第２～第８実施例において、前述した第１実施例の構成要素に対応する構成要素には、第１実施例の符号と同じ符号が付してある。

【００２９】図３は本発明の第２実施例を示すもので、図２の第１実施例ではクラッチ９が遊星歯車機構４のリングギヤ６およびサンギヤ９を直接結合しているのに対し、図３の第２実施例ではリングギヤ６およびクラッチ９間に減速ギヤ列３１を配置している。減速ギヤ列３１は、発電電動機出力部材２に一体に設けた第１ギヤ３２と、クラッチアウター３３に一体に設けた第４ギヤ３４と、中間軸３５に設けられて第１ギヤ３２に噛合する第２ギヤ３６と、前記中間軸３５に設けられて第４ギヤ３４に噛合する第３ギヤ３７とから構成される。

【００３０】この実施例によれば、減速ギヤ列３１により発電電動機出力部材２および駆動力出力部材３間の減速比を任意に設定することができるだけでなく、充分な減速比を容易に確保することができる。但し、減速ギヤ列３１がパワーユニットのセンターラインから半径方向

に偏倚しているため、減速ギヤ列３１のコンパクトな配置が難しくなる。

【００３１】図４は本発明の第３実施例を示すもので、この第３実施例は減速ギヤ列３１の構造において図３の第２実施例と異なっている。即ち、遊星歯車機構よりなる減速ギヤ列３１は、ケーシングに固定されたプラネタリキャリヤ３８と、プラネタリキャリヤ３８に支持された複数のプラネタリギヤ３９と、発電電動機出力部材２に固定されてプラネタリギヤ３９に噛合するリングギヤ４０と、クラッチアウター３３に固定されてプラネタリギヤ３９に噛合するサンギヤ４１とから構成される。

【００３２】この実施例によれば、減速ギヤ列３１により発電電動機出力部材２および駆動力出力部材３間の減速比を任意に設定することができるだけでなく、減速ギヤ列３１をパワーユニットのセンターライン上にコンパクトに配置することができる。

【００３３】図５は本発明の第４実施例を示すもので、この第４実施例の遊星歯車機構４はリングギヤを備えておらず、その代わりに前記プラネタリギヤ８と同一軸に支持された第２プラネタリギヤ８′と、前記サンギヤ７と同軸上に相対回転自在に支持された第２サンギヤ７′とを備えており、第２サンギヤ７′がクラッチアウター３３に一体に接続される。プラネタリギヤ８およびサンギヤ７間の歯数比と、第２プラネタリギヤ８′および第２サンギヤ７′間の歯数比とは異なるように設定されており、従ってクラッチ９のスリップ量を変化させることにより、発電電動機出力部材２および駆動力出力部材３間の減速比を調整することができる。

【００３４】この実施例によれば、遊星歯車機構４が大型になり易いが、発電電動機出力部材２および駆動力出力部材３間の減速比を充分に確保することができる。

【００３５】図６～図９はそれぞれ本発明の第５～第８実施例を示すもので、これら第５～第８実施例は前述した第１～第４実施例にそれぞれ対応している。即ち、図６の第５実施例は図２の第１実施例の変形であり、図７の第６実施例は図３の第２実施例の変形であり、図８の第７実施例は図４の第３実施例の変形であり、図９の第８実施例は図５の第４実施例の変形である。

【００３６】図２～図４の第１～第３実施例では、発電電動機出力部材２が遊星歯車機構４のリングギヤ６に接続され、且つ駆動力出力部材３が遊星歯車機構４のサンギヤ７に接続されているが、図６～図８の第５～第７実施例ではそれらの接続関係が逆になっており、発電電動機出力部材２が遊星歯車機構４のサンギヤ７に接続され、且つ駆動力出力部材３が遊星歯車機構４のリングギヤ６に接続されている。

【００３７】また図５の第４実施例では、発電電動機出力部材２が遊星歯車機構４の第２サンギヤ７′に接続され、且つ駆動力出力部材３が遊星歯車機構４のサンギヤ７に接続されているが、図９の第８実施例ではそれらの接続関係が逆になっており、発電電動機出力部材２が遊星歯車機構４のサンギヤ７に接続され、且つ駆動力出力部材３が遊星歯車機構４の第２サンギヤ７′に接続されている。

【００３８】これら第５～第８実施例によっても、前述した第１～第４実施例と同様の作用効果を達成することができる。

【００３９】以上、本発明の実施例を詳述したが、本発明はその要旨を逸脱しない範囲で種々の設計変更を行うことが可能である。

【００４０】例えば、遊星歯車機構４のプラネタリキャリヤ５、リングギヤ６およびサンギヤ７の３つの要素は、内燃機関出力部材１、発電電動機出力部材２および駆動力出力部材３の３つの要素に任意の組み合わせで接続することができる。またバッテリ９に代えてキャパシタを採用することができる。また第２発電電動機G_{ML}，G_{MR}は単なる電動機であっても良い。

【００４１】

【発明の効果】以上のように請求項１に記載された発明によれば、クラッチで内燃機関出力部材を駆動力出力部材に結合した状態で内燃機関を駆動すると、内燃機関の駆動力を直接駆動輪に伝達することが可能になって急発進性能や急加速性能が向上する。

【００４２】また請求項２に記載された発明によれば、内燃機関で主駆動輪および発電電動機を駆動し、発電電動機で発電した電力で副駆動輪を駆動するので、簡単な構造で４輪駆動を実現することができる。

【００４３】また請求項３に記載された発明によれば、左右の電動機で左右の副駆動輪をそれぞれ駆動することにより、左右の副駆動輪に異なる駆動力を配分して車両のヨーモーメントを制御することができる。

【００４４】また請求項４に記載された発明によれば、発電電動機を駆動して車両を後進走行させるときにロック手段で内燃機関出力部材の回転を規制することにより、内燃機関が逆転駆動されるのを未然に防止することができる。

【００４５】また請求項５に記載された発明によれば、動力伝達手段として遊星歯車機構を用いることにより、内燃機関出力部材、発電電動機出力部材および駆動力出力部材間での駆動力の伝達および配分を簡単な構造で行うことができる。

【図面の簡単な説明】

【図１】ハイブリッド車両の全体構成図

【図２】ハイブリッド車両のパワーユニットのスケルトン図

【図３】第２実施例に係るパワーユニットのスケルトン図

【図４】第３実施例に係るパワーユニットのスケルトン図

【図５】第４実施例に係るパワーユニットのスケルトン

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
358 of 584

図
【図６】第５実施例に係るパワーユニットのスケルトン図
【図７】第６実施例に係るパワーユニットのスケルトン図
【図８】第７実施例に係るパワーユニットのスケルトン図
【図９】第８実施例に係るパワーユニットのスケルトン図
【符号の説明】
１　　内燃機関出力部材
２　　発電電動機出力部材
３　　駆動力出力部材
４　　遊星歯車機構（動力伝達手段）
５　　プラネタリキャリヤ
６　　リングギヤ
７　　サンギヤ
１０　　ロック手段
Ｅ　　内燃機関
ＧＭ　　第１発電電動機（発電電動機）
GM_L，GM_R　　第２発電電動機（電動機）
W_{FL}，W_{FR}　　前輪（駆動輪、主駆動輪）
W_{RL}，W_{RR}　　後輪（副駆動輪）

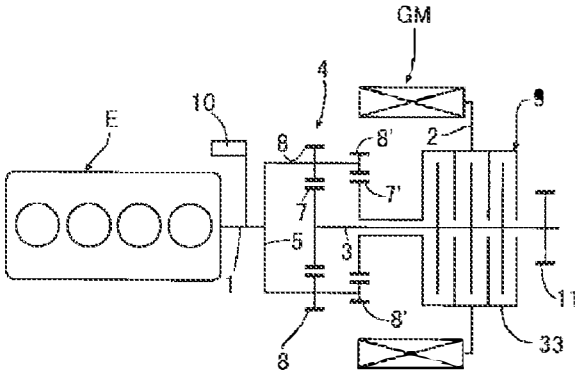
【図１】

【図２】

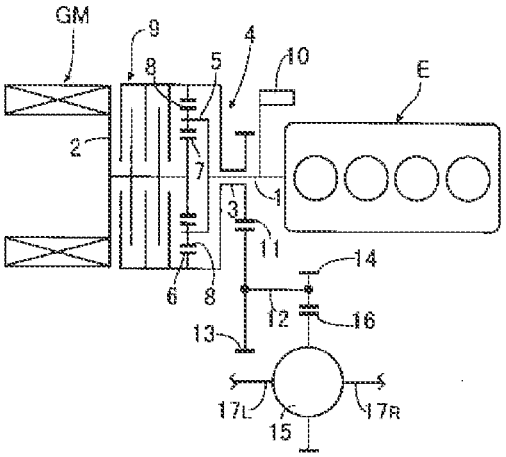
【図４】

【図３】

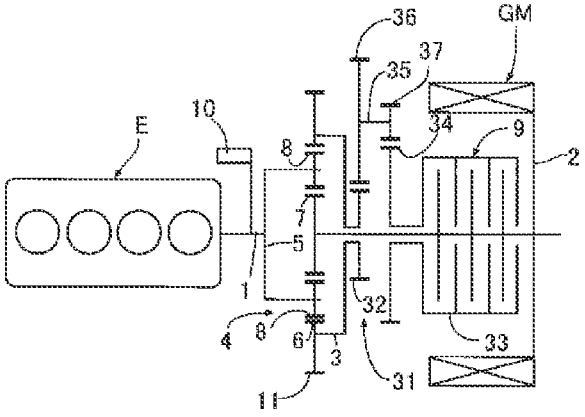
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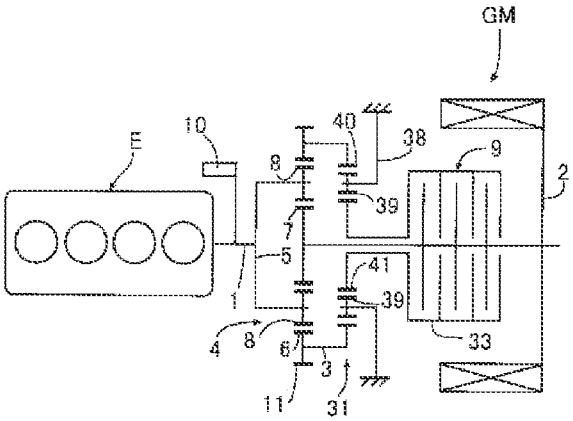
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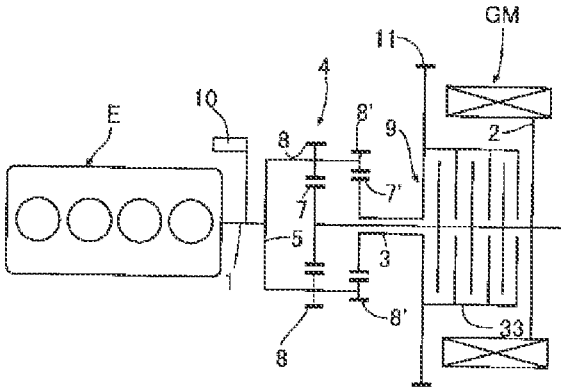
【図7】



【図8】



【図9】



フロントページの続き

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EN

HYBRID VEHICLE

Abstract

PROBLEM TO BE SOLVED: To enhance rapid starting performance and rapid acceleration performance using driving force of internal combustion engine in a hybrid vehicle having an internal combustion engine and a generation motor as power sources for driving. SOLUTION: This planet gear mechanism 4 transmits and distributes a driving force between an internal combustion engine E, a generation motor GM and a driving wheel. The planet gear mechanism 4 comprises a planetary carrier 5 which is connected to an internal combustion engine output member 1, a ring gear 6 which is connected to a generation motor output member 2, and a sun gear 7 which is connected to a driving force output member 3. When a vehicle starts and accelerates rapidly, a clutch 9 is engaged to restrict a differential of the planet gear mechanism 4. This integrates the internal combustion engine output member 1, the generation motor output member 2, and the driving force output member 3, so that a driving force of the

internal combustion engine can be transmitted directly to the driving force output member 3.

[0001] BACKGROUND OF THE INVENTION 1. Field of the Invention The present invention relates to a hybrid vehicle having an internal combustion engine and a generator motor as a power source for traveling.

[0002] 2. Description of the Related Art Such a hybrid vehicle is already known, for example, from Japanese Patent Laid-Open No. 9-175203. The hybrid vehicle uses a planetary gear mechanism as power transmission means, a planetary carrier is connected to an internal combustion engine, a sun gear is connected to a generator motor, and a ring gear is connected to driving wheels. The rotation of the internal combustion engine or the generator motor is transmitted to the drive wheels for traveling, and the rotation of the internal combustion engine or the drive wheels is transmitted to the generator motor to generate electric power.

[0003] However, in the above-mentioned conventional one, when the internal combustion engine is driven for the purpose of sudden start or rapid acceleration, the driving force of the internal combustion engine is applied to the drive wheels and the generator motor through the planetary gear mechanism. Since the distribution amount of the driving force is increased to the side of the generator motor, which has a smaller load than the driving wheels, the driving force of the internal combustion engine cannot be sufficiently transmitted to the driving wheels, resulting in sudden start performance and There is a problem that it is difficult to improve the rapid acceleration performance.

[0004] The present invention has been made in view of the above circumstances, and an object of the present invention is to enhance a rapid start performance and a rapid acceleration performance by a driving force of an internal combustion engine in a hybrid vehicle including an internal combustion engine and a generator motor as a power source for traveling. And

[0005] In order to achieve the above object, the invention described in claim 1 is an internal combustion engine output member connected to an internal combustion engine, and a generator motor output member connected to a generator motor. , A power transmission means for transmitting and distributing the driving force to and from the driving force output member connected to the driving wheels, and transmitting the rotation of the internal combustion engine output member or the generator motor output member to the driving force output member. In a hybrid vehicle that travels as a vehicle and transmits the rotation of the internal combustion engine output member or the driving force output member to the generator motor output member to generate electric

power, a clutch that can connect the internal combustion engine output member to the driving force output member is provided. Is characterized by.

[0006] According to the above structure, when the internal combustion engine output member is connected to the driving force output member by the clutch and the internal combustion engine is driven, the driving force of the internal combustion engine can be directly transmitted to the drive wheels, and sudden start performance and Sudden acceleration performance is improved.

[0007] The invention described in claim 2 is characterized in that, in addition to the structure of claim 1, the main drive wheels are driven by the internal combustion engine, and the auxiliary drive wheels are driven by the electric power generated by the generator motor.

[0008] According to the above configuration, the main drive wheels and the generator motor are driven by the internal combustion engine, and the auxiliary drive wheels are driven by the electric power generated by the generator motor, so that four-wheel drive can be realized with a simple structure.

[0009] The invention described in claim 3 is characterized in that, in addition to the configuration of claim 2, it is provided with left and right electric motors for respectively driving the left and right auxiliary drive wheels.

[0010] According to the above configuration, by driving the left and right auxiliary drive wheels by the left and right electric motors respectively, different driving forces can be distributed to the left and right auxiliary drive wheels to control the yaw moment of the vehicle.

[0011] Further, the invention described in claim 4 is characterized in that, in addition to the structure of claim 1, a lock means for restricting rotation of the internal combustion engine output member during reverse traveling is provided.

[0012] According to the above configuration, the rotation of the internal combustion engine output member is restricted by the lock means when the generator motor is driven to drive the vehicle in the reverse direction, whereby it is possible to prevent the internal combustion engine from being reversely driven. ..

[0013] According to a fifth aspect of the present invention, in addition to the configuration of the first aspect, the power transmission means is a planetary gear mechanism, and the planetary carrier, ring gear, and sun gear are the internal

combustion engine output member and the generator/motor output member. And a driving force output member, respectively.

[0014] According to the above configuration, by using the planetary gear mechanism as the power transmission means, it is possible to transmit and distribute the driving force among the internal combustion engine output member, the generator motor output member and the driving force output member with a simple structure. ..

[0015] BEST MODE FOR CARRYING OUT THE INVENTION Embodiments of the present invention will be described below based on the embodiments of the present invention shown in the accompanying drawings.

[0016] 1 and 2 show a first embodiment of the present invention. FIG. 1 is an overall configuration diagram of a hybrid vehicle, and FIG. 2 is a skeleton diagram of a power unit of the hybrid vehicle.

[0017] As shown in FIG. 1, a four-wheel drive hybrid vehicle is provided with left and right front wheels WFL and WFR that are main drive wheels and left and right rear wheels WRL and WRR that are auxiliary drive wheels. The left and right front wheels WFL and WFR are internal combustion wheels. It is driven by the engine E and the first generator motor GM, and the left and right rear wheels WRL, WRR are driven by the left and right second generator motors GML, GMR, respectively. The first generator motor GM and the left and right second generator motors GML and GMR all function as electric motors to generate driving force, and also function as generators to generate electric power while generating regenerative braking force.

[0018] As will be apparent with reference to FIG. 2 as well, on the outer periphery of the shaft-shaped internal combustion engine output member 1 connected to the crankshaft of the internal combustion engine E, the annular generator motor output connected to the rotor of the first generator motor GM The member 2 and the cylindrical driving force output member 3 connected to the front wheels WFL and WFR are arranged coaxially, and the internal combustion engine output member 1, the generator motor output member 2 and the driving force output member 3 are power transmission means. Are connected to each other via a planetary gear mechanism 4. The planetary gear mechanism 4 includes a planetary carrier 5, a ring gear 6, a sun gear 7, and a plurality of planetary gears 8 supported by the planetary carrier 5 and meshing with the ring gear 6 and the sun gear 7, and the planetary carrier 5 outputs the internal combustion engine. It is fixed to the member 1, the ring gear 6 is fixed to the generator motor output member 2, and the sun gear 7 is fixed to the driving force output member 3.

[0019] The generator motor output member 2 and the driving force output member 3 can be integrally connected by a wet multi-plate clutch 9. Further, between the internal combustion engine output member 1 and a casing (not shown), locking means 10 composed of an electromagnetic clutch is provided in order to prevent the internal combustion engine E from rotating in the opposite direction. The final drive gear 11 provided on the driving force output member 3 meshes with the first intermediate gear 13 provided on the intermediate shaft 12, and the second intermediate gear 14 provided on the intermediate shaft 12 meshes with the final driven gear 16 provided on the differential 15. To do. The differential 15 is connected to the left and right front wheels WFL, WFR via the left and right front wheel drive shafts 17L, 17R.

[0020] The left and right second generator motors GML and GMR are connected to the left and right rear wheels WRL and WRR via planetary gear type left and right speed reducers 18L and 18R and left and right rear wheel drive shafts 19L and 19R, respectively. In the speed reducers 18L and 18R, the sun gears are connected to the second generator motors GML and GMR, the planetary carriers are connected to the rear wheel drive shafts 19L and 19R, and the ring gears are fixed to a casing (not shown) so that they cannot rotate.

[0021] The first generator motor GM and the left and right second generator motors GML and GMR are connected to the battery 20 via a PDU 21 (power drive unit) composed of an inverter. The PDU 21 controls driving of the first generator-motor GM and the second generator-motor GML, GMR by the battery 20, and charging of the battery 20 by regeneration of the first generator-motor GM and the second generator-motor GML, GMR.

[0022] Next, the operation of the embodiment of the present invention having the above configuration will be described. By engaging the clutch 9 and integrally coupling the ring gear 6 and the sun gear 7 of the planetary gear mechanism 4, the first power generation is performed with the internal combustion engine output member 1, the generator motor output member 2 and the driving force output member 3 being integrated. Drive the electric motor GM. As a result, the rotation of the generator motor output member 2 of the first generator motor GM is transmitted to the driving force output member 3 via the clutch 9, and the rotation of the driving force output member 3 is final drive gear 11 and the first intermediate gear 13. , The intermediate shaft 12, the second intermediate gear 14, the final driven gear 16, the differential 15, and the front wheel drive shafts 17L, 17R to the left and right front wheels WFL, WFR. At this time, the internal combustion engine E is forcibly driven by the rotating internal combustion engine output member 1, but the internal combustion engine E is idly driven with no load by being controlled by the valve

stop mechanism so that pumping loss does not occur. The left and right rear wheels WRL, WRR are driven by the left and right second generator motors GML, GMR fed from the battery 20.

[0023] In this way, since the vehicle is started by the first generator motor GM and the left and right second generator motors GML, GMR, which have a larger low-speed torque than the internal combustion engine E, a smooth start is possible.

[0024] If the remaining capacity of the battery 20 is insufficient when the vehicle starts, the internal combustion engine E is driven with the clutch 9 disengaged and the ring gear 6 and the sun gear 7 of the planetary gear mechanism 4 disengaged. As a result, the torque of the internal combustion engine output member 1 connected to the internal combustion engine E is distributed to the generator motor output member 2 and the driving force output member 3 via the planetary gear mechanism 4. That is, when the planetary carrier 5 integrated with the internal combustion engine output member 1 rotates, the first generator motor GM connected to the ring gear 6 and the driving force output member 3 connected to the sun gear 7 rotate according to their loads. Rotate by number. Thus, the front wheels WFL and WFR connected to the driving force output member 3 are driven to start the vehicle, and the battery 20 is charged by the electric power generated by the first generator motor GM, and the left and right electric power is generated by the electric power. The second generator motors GML, GMR are driven to drive the rear wheels WRL, WRR to assist the vehicle in starting.

[0025] When the driving force transmitted from the internal combustion engine E to the front wheels WFL, WFR is insufficient, the clutch 9 is engaged with a predetermined engaging force to limit the differential of the planetary gear mechanism 4, so that the front wheels WFL, WFR are not affected. The transmitted driving force can be increased.

[0026] When the first generator motor GM drives the front wheels WFL, WFR to start, when the vehicle speed reaches a predetermined value, the fuel injection is started and the idling internal combustion engine E is started. At the same time, the driving of the first generator motor GM is stopped and the engagement of the clutch 9 is released. As a result, the driving force of the internal combustion engine E is transmitted to the front wheels WFL and WFR, just as when the internal combustion engine E starts to move. During normal traveling of the vehicle, the driving force transmitted from the internal combustion engine E to the front wheels WFL, WFR is controlled by adjusting the load of the first generator-motor GM as the output of the internal combustion engine E increases, and Electric power generated by the generator motor GM drives the left and

right second generator motors GML and GMR to assist the acceleration of the vehicle. Further, by making the driving forces of the left and right second generator motors GML and GMR different, it is possible to control the yaw moment of the vehicle and improve the turning performance and straight running stability performance. In this case, it is also possible to drive one of the left and right second generator motors GML and GMR to regenerate the other. During cruise of the vehicle, the assist by the left and right second generator motors GML and GMR is stopped, and the vehicle is driven only by the driving force of the internal combustion engine E. At this time, the first generator motor GM or the left and right second generator motors GML and GMR are caused to function as alternators, and the power generated thereby charges the 12-volt auxiliary battery. Sudden start and sudden acceleration that require a large driving force during sudden start and sudden acceleration are performed by the internal combustion engine E that can generate a larger driving force than the first generator-motor GM. If the internal combustion engine E is driven with the clutch 9 disengaged, its driving force is distributed to the generator motor output member 2 and the drive force output member 3 by the planetary gear mechanism 4, but the first generator motor GM Since the load is smaller than the loads on the front wheels WFL, WFR, most of the driving force is distributed to the first generator motor GM, and the front wheels WFL, WFR cannot be effectively driven, resulting in sudden start or rapid acceleration. I can't do it.

[0027] Therefore, at the time of sudden start and rapid acceleration, the internal combustion engine E is driven with the clutch 9 engaged. Since the internal combustion engine output member 1, the generator motor output member 2 and the driving force output member 3 are integrated by engaging the clutch 9, a large driving force of the internal combustion engine E is directly transmitted to the front wheels WFL and WFR. The rapid start performance and the rapid acceleration performance of the vehicle can be improved. At this time, by driving the left and right second generator motors GML and GMR, the rapid start performance and the rapid acceleration performance can be further enhanced. When the vehicle is traveling in reverse, the internal combustion engine E is stopped, the clutch 9 is disengaged to disconnect the ring gear 6 and the sun gear 7 of the planetary gear mechanism 4, and the locking means 10 composed of an electromagnetic clutch is operated to operate the internal combustion engine output member 1 The first generator motor GM is driven in the forward rotation direction (forward direction) in a state in which the rotation of the first rotation motor is restricted. At this time, since the rotation of the planetary carrier 5 integrated with the internal combustion engine output member 1 is restricted, the rotation of the ring gear 6 integrated with the generator motor output member 2 causes the driving force output member 3 to pass through the planetary gear 8 and the sun gear 7. The vehicle is driven in reverse to drive the vehicle in reverse. At the same time, the left and right

second generator motors GML and GMR are reversely driven by the electric power from the battery 9 to assist the first generator motor GM. During braking of the vehicle, the internal combustion engine E is fuel-cut to a no-load state, and then the clutch 9 is engaged to reversely transfer the rotation of the front wheels WFL and WFR to the first generator-motor GM, whereby the first generator-motor Regenerative braking force is generated in GM. The generated regenerative power is used to charge the battery 9. Further, the rotation of the rear wheels WRL, WRR is reversely transmitted to the left and right second generator motors GML, GMR to generate a regenerative braking force, and the battery 9 is charged with the generated regenerative power.

[0028] Next, second to eighth embodiments of the present invention will be described with reference to FIGS. Incidentally, in the second to eighth embodiments, the constituents corresponding to the constituents of the first embodiment described above are designated by the same reference numerals as those of the first embodiment.

[0029] FIG. 3 shows a second embodiment of the present invention. In the first embodiment of FIG. 2, the clutch 9 directly connects the ring gear 6 and the sun gear 9 of the planetary gear mechanism 4, while the clutch 9 of FIG. In the second embodiment, the reduction gear train 31 is arranged between the ring gear 6 and the clutch 9. The reduction gear train 31 is provided on the generator motor output member 2 integrally with a first gear 32, a clutch outer 33 is integrally provided with a fourth gear 34, and an intermediate shaft 35 is meshed with the first gear 32. It comprises a second gear 36 and a third gear 37 provided on the intermediate shaft 35 and meshing with the fourth gear 34.

[0030] According to this embodiment, not only the reduction gear train 31 can arbitrarily set the reduction ratio between the generator motor output member 2 and the driving force output member 3, but also a sufficient reduction ratio can be easily secured. .. However, since the reduction gear train 31 is displaced from the center line of the power unit in the radial direction, it becomes difficult to arrange the reduction gear train 31 compactly.

[0031] FIG. 4 shows a third embodiment of the present invention, which differs from the second embodiment of FIG. 3 in the structure of the reduction gear train 31. That is, the reduction gear train 31 including the planetary gear mechanism is meshed with the planetary carrier 38 fixed to the casing, the plurality of planetary gears 39 supported by the planetary carrier 38, and the planetary gear 39 fixed to the generator/motor output member 2. It is composed of a ring gear 40 and a sun gear 41 fixed to the clutch outer 33 and meshing with the planetary gear 39.

[0032] According to this embodiment, not only the reduction gear train 31 can arbitrarily set the reduction ratio between the generator motor output member 2 and the driving force output member 3, but also the reduction gear train 31 is compact on the center line of the power unit. Can be placed at.

[0033] FIG. 5 shows a fourth embodiment of the present invention. The planetary gear mechanism 4 of the fourth embodiment does not include a ring gear, but instead, a second planetary gear 8 supported on the same axis as the planetary gear 8 is provided. ' And a second sun gear 7 ' that is supported coaxially with the sun gear 7 so as to be rotatable relative to each other, and the second sun gear 7 ' is integrally connected to the clutch outer 33. The tooth number ratio between the planetary gear 8 and the sun gear 7 and the tooth number ratio between the second planetary gear 8'and the second sun gear 7'are set to be different. Therefore, by changing the slip amount of the clutch 9, The reduction ratio between the generator motor output member 2 and the driving force output member 3 can be adjusted.

[0034] According to this embodiment, the planetary gear mechanism 4 tends to be large in size, but a sufficient reduction ratio between the generator motor output member 2 and the driving force output member 3 can be secured.

[0035] 6 to 9 show fifth to eighth embodiments of the present invention, respectively, and these fifth to eighth embodiments correspond to the above-described first to fourth embodiments, respectively. That is, the fifth embodiment of FIG. 6 is a modification of the first embodiment of FIG. 2, the sixth embodiment of FIG. 7 is a modification of the second embodiment of FIG. 3, and the seventh embodiment of FIG. This is a modification of the third embodiment of FIG. 4, and the eighth embodiment of FIG. 9 is a modification of the fourth embodiment of FIG.

[0036] In the first to third embodiments of FIGS. 2 to 4, the generator motor output member 2 is connected to the ring gear 6 of the planetary gear mechanism 4, and the driving force output member 3 is connected to the sun gear 7 of the planetary gear mechanism 4. However, in the fifth to seventh embodiments of FIGS. 6 to 8, the connection relations thereof are reversed, the generator motor output member 2 is connected to the sun gear 7 of the planetary gear mechanism 4, and the driving force output member is connected. 3 is connected to the ring gear 6 of the planetary gear mechanism 4.

[0037] In the fourth embodiment of FIG. 5, the generator motor output member 2 is connected to the second sun gear 7 ' of the planetary gear mechanism 4, and the driving force output member 3 is connected to the sun gear 7 of the planetary gear

mechanism 4. In the eighth embodiment shown in FIG. 9, the connection relationships are reversed, the generator motor output member 2 is connected to the sun gear 7 of the planetary gear mechanism 4, and the driving force output member 3 is connected to the planetary gear mechanism 4. 2 is connected to the sun gear 7'.

[0038] Also by these fifth to eighth embodiments, it is possible to achieve the same effects as the first to fourth embodiments described above.

[0039] Although the embodiments of the present invention have been described above in detail, the present invention can be modified in various ways without departing from the scope of the invention.

[0040] For example, the three elements of the planetary carrier 5, the ring gear 6, and the sun gear 7 of the planetary gear mechanism 4 are connected to the three elements of the internal combustion engine output member 1, the generator motor output member 2, and the driving force output member 3 in any combination. be able to. A capacitor may be used instead of the battery 9. The second generator motors GML and GMR may be simple motors.

[0041] As described above, according to the invention described in claim 1, when the internal combustion engine is driven with the clutch coupling the internal combustion engine output member to the driving force output member, the driving force of the internal combustion engine is directly It becomes possible to transmit to the drive wheels, which improves the rapid start performance and the rapid acceleration performance.

[0042] According to the invention described in claim 2, the main drive wheels and the generator motor are driven by the internal combustion engine, and the auxiliary drive wheels are driven by the electric power generated by the generator motor, so that four-wheel drive is realized with a simple structure. can do.

[0043] According to the third aspect of the present invention, the left and right auxiliary drive wheels are driven by the left and right electric motors respectively, so that different driving forces are distributed to the left and right auxiliary drive wheels to control the yaw moment of the vehicle. You can

[0044] Further, according to the invention described in claim 4, the internal combustion engine is reversely driven by restricting the rotation of the internal combustion engine output member by the lock means when the generator motor is driven to drive the vehicle in the reverse direction. It can be prevented.

[0045] Further, according to the invention described in claim 5, by using the planetary gear mechanism as the power transmission means, transmission and distribution of the driving force among the internal combustion engine output member, the generator motor output member and the driving force output member can be simplified. It can be performed with various structures.

[0046] Brief description of the drawings

[0047] Figure 1 Overall configuration of hybrid vehicle

[0048] Figure 2 Skeleton diagram of power unit of hybrid vehicle

[0049] 3 is a skeleton diagram of the power unit according to the second embodiment

[0050] 4 is a skeleton diagram of the power unit according to the third embodiment

[0051] 5 is a skeleton diagram of the power unit according to the fourth embodiment

[0052] 6 is a skeleton diagram of the power unit according to the fifth embodiment

[0053] 7 is a skeleton diagram of the power unit according to the sixth embodiment

[0054] 8 is a skeleton diagram of the power unit according to the seventh embodiment

[0055] 9 is a skeleton diagram of the power unit according to the eighth embodiment

[0056] Explanation of symbols

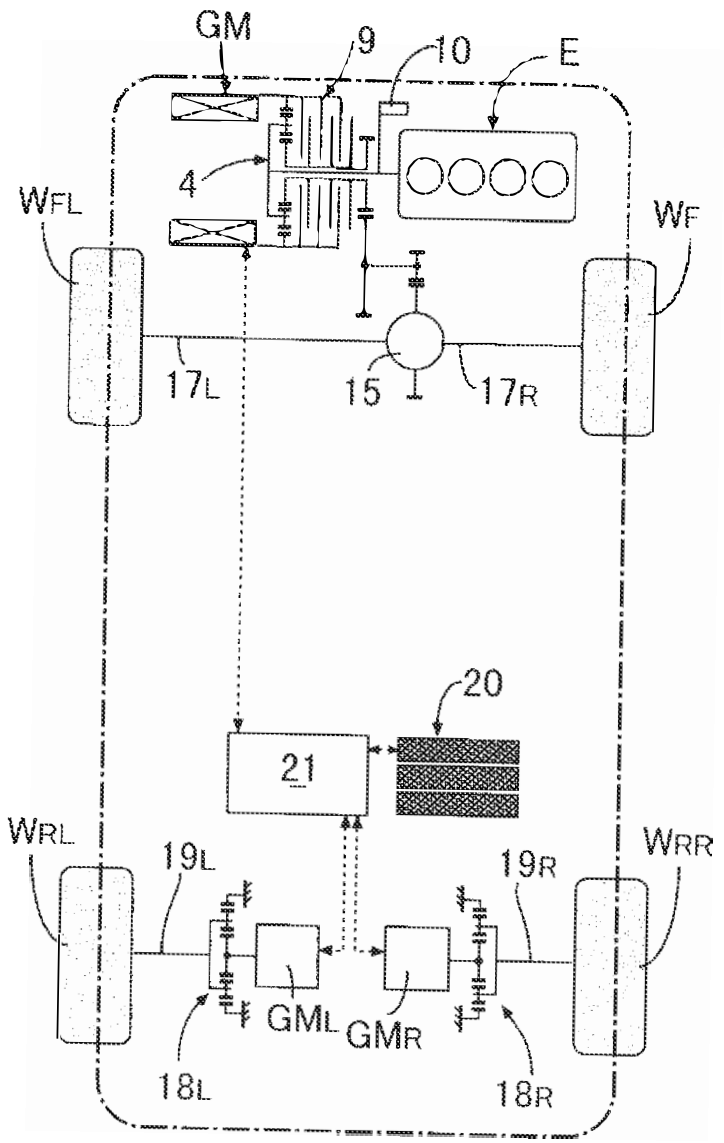
[0057] 1 Internal Combustion Engine Output Member 2 Generator Motor Output Member 3 Driving Force Output Member 4 Planetary Gear Mechanism (Power Transmission Means) 5 Planetary Carrier 6 Ring Gear 7 Sun Gear 10 Lock Means E Internal Combustion Engine GM 1st Generator Motor (Generator Motor) GML, GMR 1st 2 Generator motor (electric motor) WFL, WFR Front wheels (driving wheels, main driving wheels) WRL, WRR Rear wheels (auxiliary driving wheels)

Claims

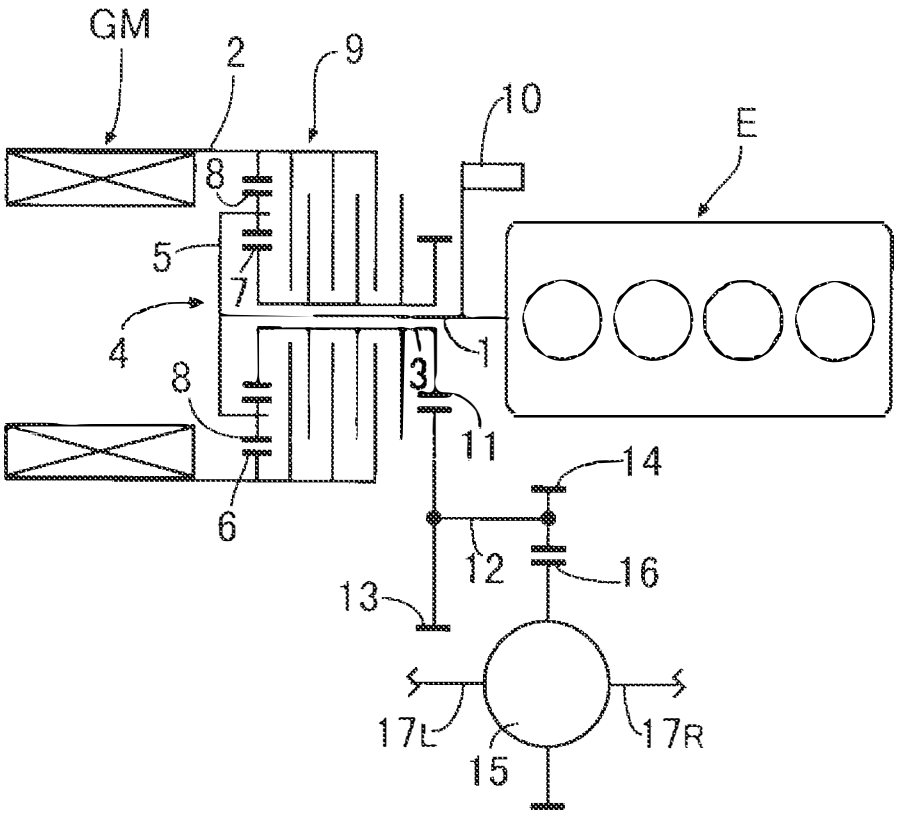
1. Internal combustion engine output member (1) connected to internal combustion engine (E), generator motor output member (2) connected to generator motor (GM), and driving force output connected to drive wheels (WFL, WFR) A power transmission means (4) for transmitting and distributing a driving force to and from the member (3) is provided, and the rotation of the internal combustion engine output member (1) or the

generator motor output member (2) is rotated by the driving force output member (In the hybrid vehicle, which transmits the rotation of the internal combustion engine output member (1) or the driving force output member (3) to the generator motor output member (2) to generate electric power while traveling while being transmitted to the internal combustion engine output member A hybrid vehicle comprising a clutch (9) capable of connecting (1) to a driving force output member (3).
2. The main drive wheels (WFL, WFR) are driven by the internal combustion engine (E), and the auxiliary drive wheels (WRL, WRR) are driven by the electric power generated by the generator motor (GM). The hybrid vehicle described.

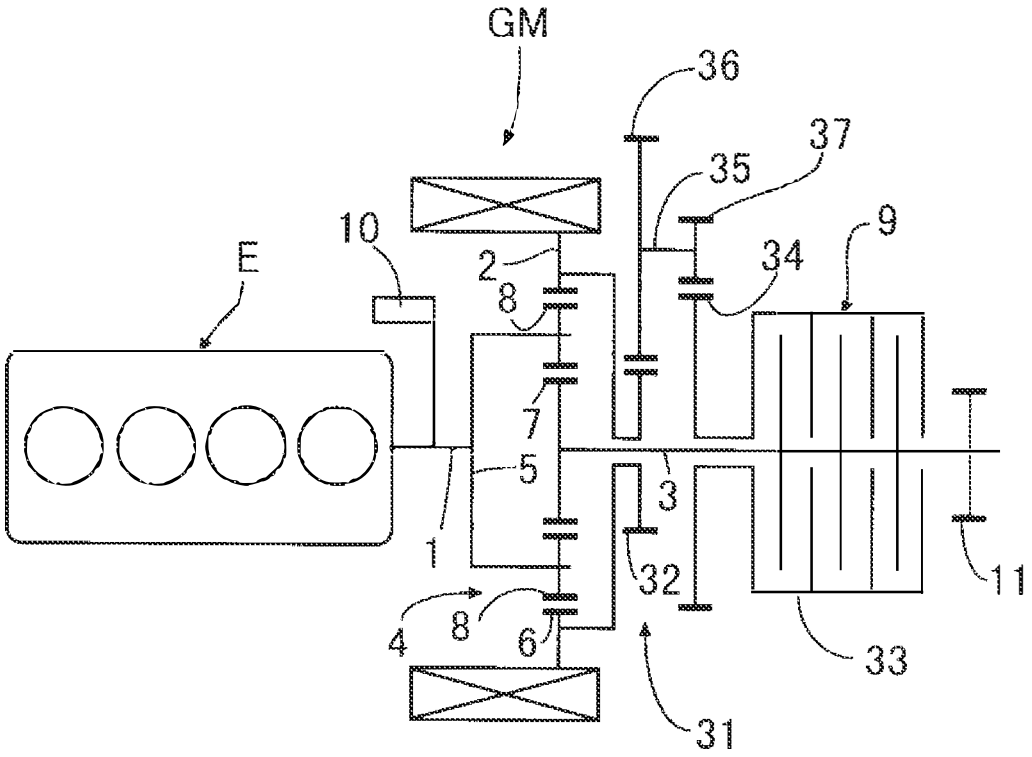
【書類名】　図面
【図１】



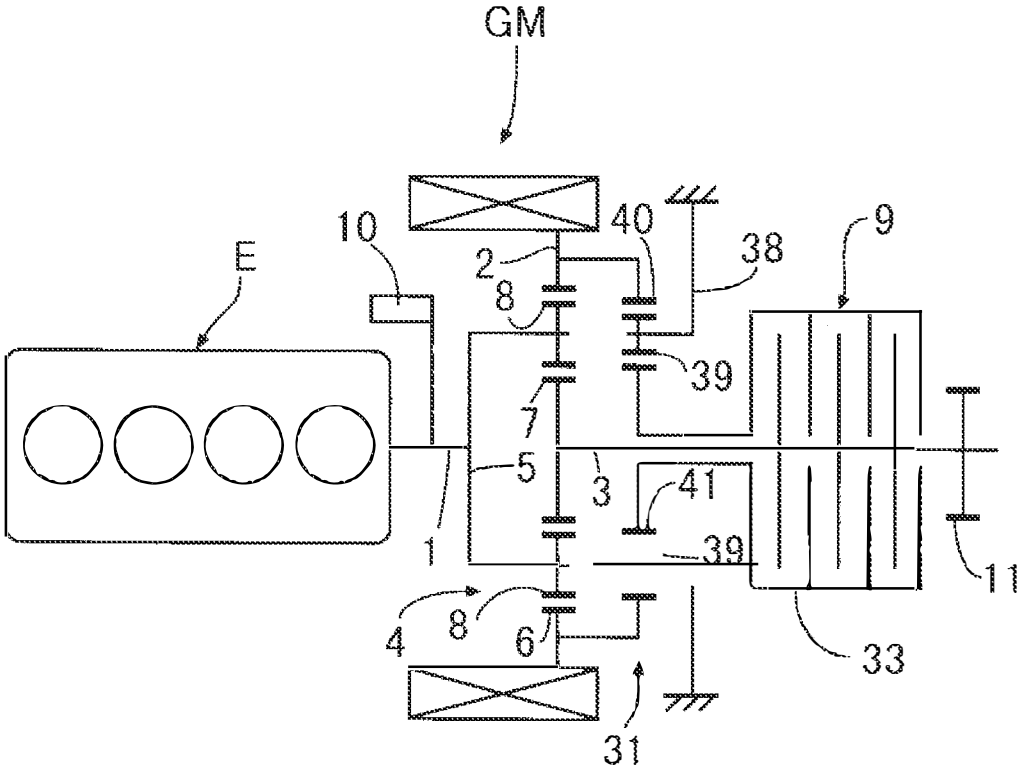
【図２】



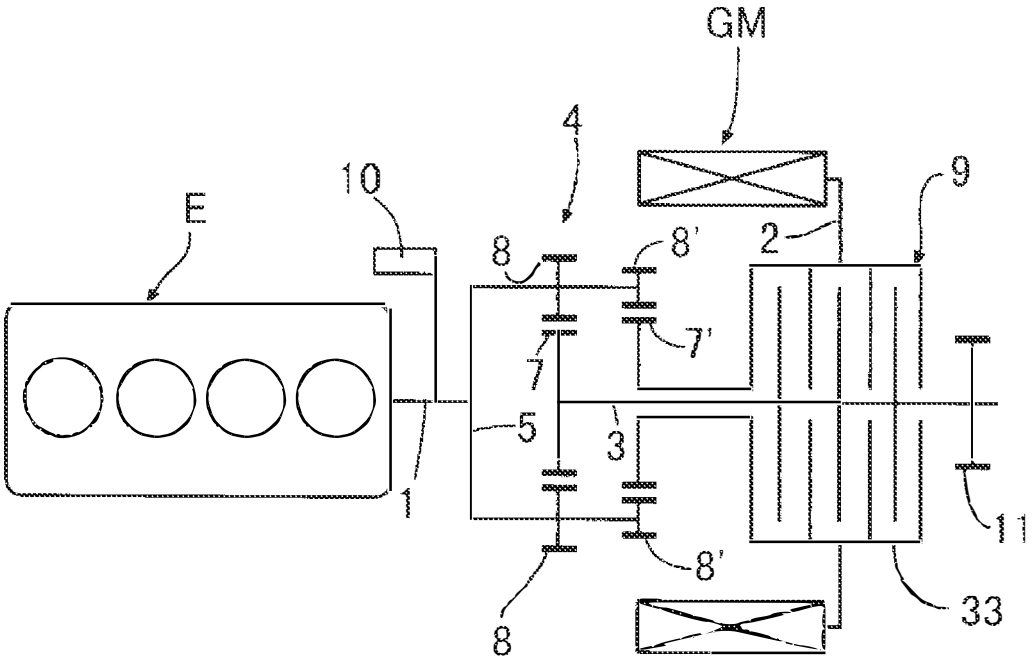
【図３】



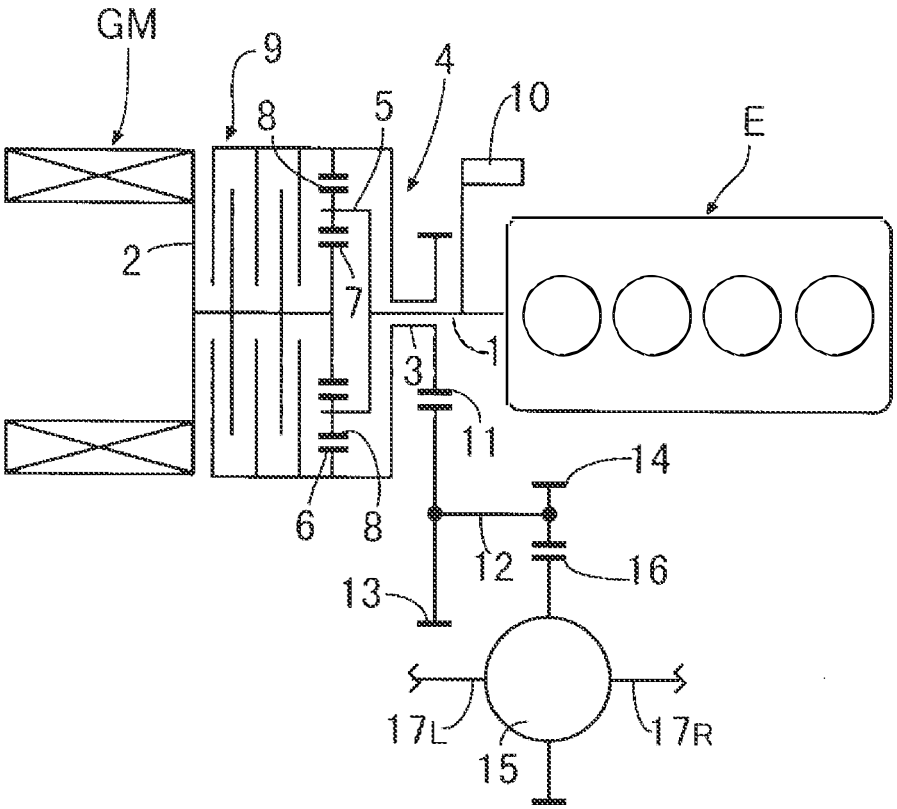
【図４】


GM
E
10
40
38
9
2
8
39
7
5
3
41
1
39
11
4
8
6
33
31

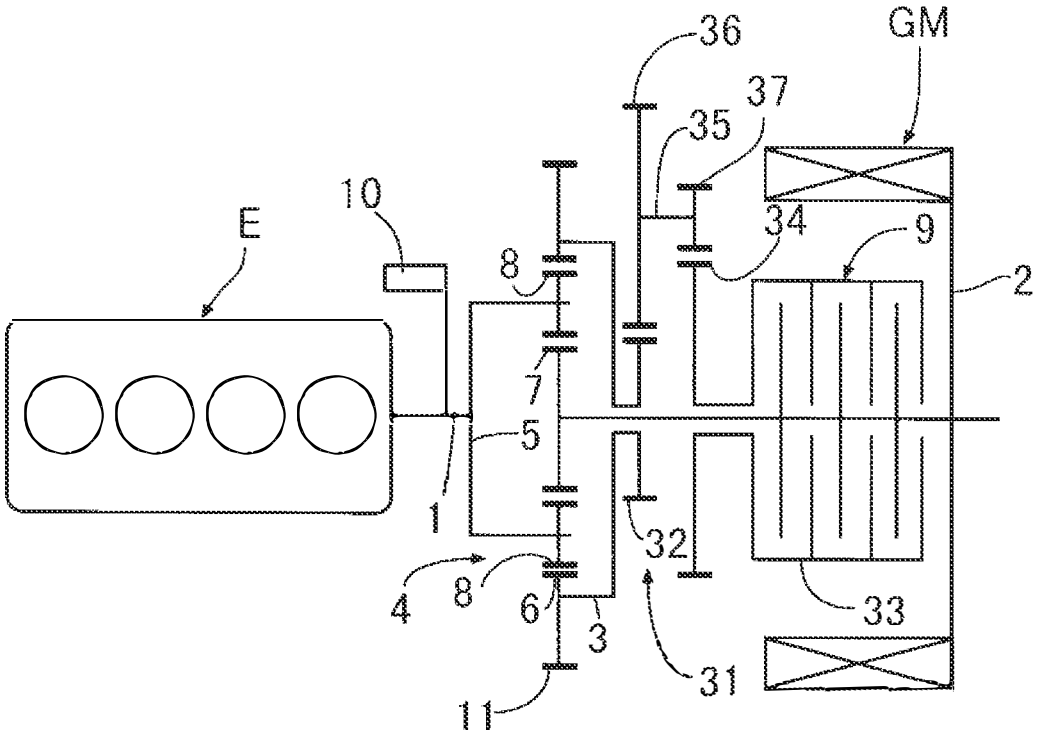
【図５】


GM
4
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7'
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8'
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33

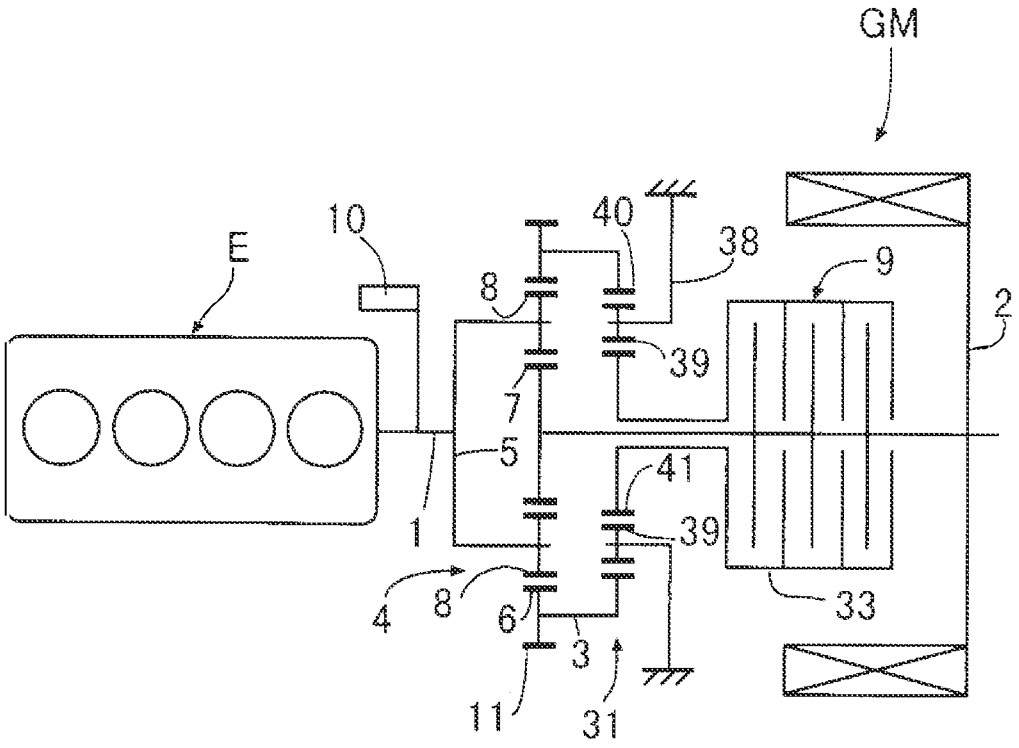
【図６】



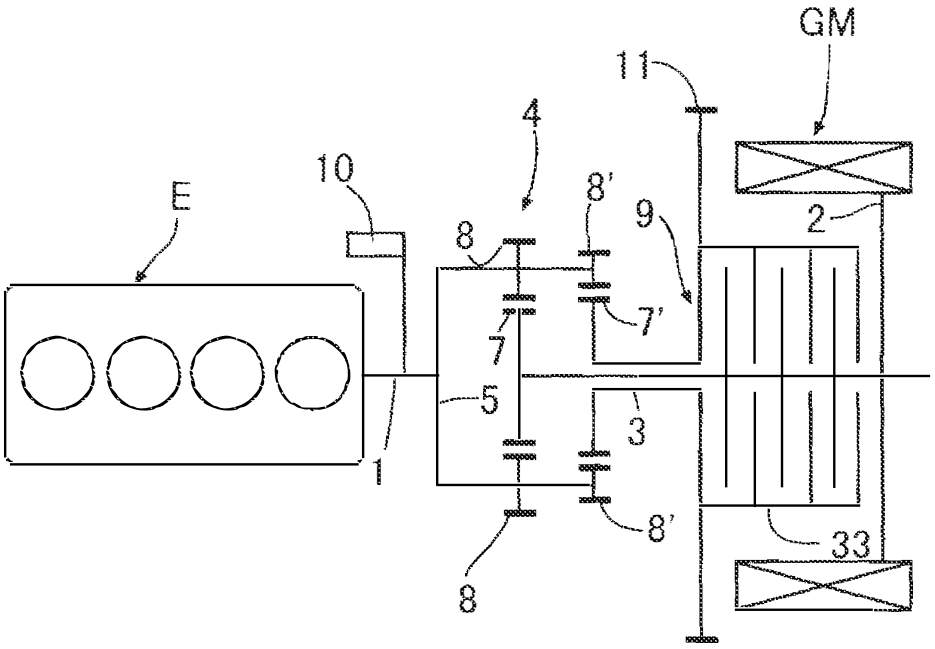
【図７】



【図８】



【図９】



Electronic Patent Application Fee Transmittal

Application Number:	16866028
Filing Date:	04-May-2020
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Frank Y. Liao/Colleen Maroney
Attorney Docket Number:	256975-US-11

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($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**260**

Electronic Acknowledgement Receipt

EFS ID:	45452522
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Frank Y. Liao/Colleen Maroney
Filer Authorized By:	Frank Y. Liao
Attorney Docket Number:	256975-US-11
Receipt Date:	12-APR-2022
Filing Date:	04-MAY-2020
Time Stamp:	12:03:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$260
RAM confirmation Number	E20224BC04160019
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)	256975US11_IDS.pdf	1034534 51326782a6fb0297a680ff27f733708ffbca65b8	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Foreign Reference	256975US11_JPH11208297.pdf	6400072 9657cb474e8cb7b77ae28c5b1aca71f43e21d285	no	28
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37996 a0ea1080aea98577ee69749372e334ad7c0101d8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7472602		

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
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

131278 7590 04/26/2022
Meagher Emanuel Laks Goldberg & Liao, LLP
One Palmer Square
Suite 325
Princeton, NJ 08542

EXAMINER
CHAN, KAWING

ART UNIT	PAPER NUMBER
2846	

NOTIFICATION DATE	DELIVERY MODE
04/26/2022	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

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 16/866,028	**Applicant(s)** Zhou et al.	
	Examiner KAWING CHAN	**Art Unit** 2846	**AIA (FITF) Status** No

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

THE REPLY FILED 08 April 2022 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☑ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: See Continuation Sheet (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☑ For purposes of appeal, the proposed amendment(s):(a) ☑ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☑ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). 04/12/2022
14. ☑ Other: PTO-2323.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:1-17.
    Claim(s) withdrawn from consideration:_____.

/KAWING CHAN/
Primary Examiner, Art Unit 2846

Continuation of 3. NOTE: The added limitations change scope of the claims; thus, further search and/or consideration is required. Although AFCP 2.0 is filed, the amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

AFCP 2.0 Decision

Application No.	Applicant(s)	
16/866,028	Zhou et al.	
Examiner	**Art Unit**	**AIA (FITF) Status**
KAWING CHAN	2846	No

This is in response to the After Final Consideration Pilot request filed 08 April 2022.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ The request is not the first proper AFCP 2.0 request submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☑ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action . See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other: _____

   Examiner Note: Please attach an interview summary when necessary as described above.

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
390 of 584

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	16866028
Filing Date	2020-05-04
First Named Inventor	Jian Zhou
Art Unit	2846
Examiner Name	CHAN, KAWING
Attorney Docket Number	256975-US-11

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					

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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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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	H11-208297	JP	A	1999-08-03	Honda Motor CO LTD		X

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

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

	1	

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

EXAMINER SIGNATURE

Examiner Signature	/KAWING CHAN/	Date Considered	04/21/2022

*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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16866028
	Filing Date	2020-05-04
	First Named Inventor	Jian Zhou
	Art Unit	2846
	Examiner Name	CHAN, KAWING
	Attorney Docket Number	256975-US-11

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	/Frank Y.Liao/	Date (YYYY-MM-DD)	2022-04-12
Name/Print	Frank Y. Liao	Registration Number	40,065

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.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.C/

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. /K.C/

DO NOT ENTER: /K.C/ 04/21/2022

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of: Jian ZHOU et al. **Application No.:** 16/866,028 **Confirmation No.:** 1053 **Filed:** May 4, 2020 **For:** ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD **Group:** 2846 **Examiner:** Kawing CHAN	**Our File:** 256975-US-11 **Date:** April 8, 2022

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY PURSUANT TO 37 C.F.R. §1.116 (RESPONSE AFTER FINAL)
FOR AFTER FINAL CONSIDERATION PILOT 2.0
(FILED CURRENTLY WITH FORM PTO/SB/434)

Dear Examiner:

This After Final reply is timely filed in response to the Final Office Action dated 02/18/2022 and is also concurrently filed with a Request for Consideration under After Final Consideration Pilot (AFCP) 2.0 (Form PTO/SB/434). Please kindly reconsider the application as follows:

Listing and Amendments of the Claims begin on page 2 of this paper.

Remarks begin on page 7 of this paper.

Please charge any fee due or credit any overpayment in connection with this reply or this application to Deposit Account 50-5522.

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
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.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16866028	Filing Date	2020-05-04	Docket Number (if applicable)	256975-US-11	Art Unit	2846
First Named Inventor	Jian Zhou			Examiner Name	CHAN, KAWING		

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 April 8, 2022

☐ 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
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	/Frank Y. Liao/	Date (YYYY-MM-DD)	2022-04-28
Name	Frank Y. Liao	Registration Number	40065

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.

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:	16866028
Filing Date:	04-May-2020
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Frank Y. Liao/Colleen Maroney
Attorney Docket Number:	256975-US-11

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($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1360	1360
		Total in USD ($)		**1360**

Electronic Acknowledgement Receipt

EFS ID:	45588610
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	Electric Drive System and Energy Management Method
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Frank Y. Liao/Colleen Maroney
Filer Authorized By:	Frank Y. Liao
Attorney Docket Number:	256975-US-11
Receipt Date:	28-APR-2022
Filing Date:	04-MAY-2020
Time Stamp:	15:29:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1360
RAM confirmation Number	E20224RF29502923
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)	256975US11_RCE.pdf	1350146 4b0dd02eeb2c6179068c1b1c3fd33f761a6d6212	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37735 8b6fad97580cab31133673bfda21f433e8598875	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1387881		

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/866,028	Filing Date 05/04/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	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), (i), 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	04/28/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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".	/MARQUITA D JONES/
*** 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.	

This collection of information is required by 37 CFR 1.16. 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 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

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 05/13/2022

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

EXAMINER	
CHAN, KAWING	
ART UNIT	PAPER NUMBER
2846	

DATE MAILED: 05/13/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

TITLE OF INVENTION: ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	08/15/2022

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. 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.

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 05/13/2022
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.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

TITLE OF INVENTION: ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	08/15/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHAN, KAWING	2846	318-478000

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 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 EX1002
Toyota v. Bunker Hill IPR2026-00333
405 of 584

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.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

131278 7590 05/13/2022

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

EXAMINER	
CHAN, KAWING	

ART UNIT	PAPER NUMBER
2846	

DATE MAILED: 05/13/2022

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 EX1002
Toyota v. Bunker Hill IPR2026-00333
406 of 584

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. 16/866,028	Applicant(s) Zhou et al.	
	Examiner KAWING CHAN	Art Unit 2846	AIA (FITF) Status No

-- 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 RCE filed on 04/28/2022.
   ☐ 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 1-17 . 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 a reply 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 _____.
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 _____.

/KAWING CHAN/
Primary Examiner, Art Unit 2846

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/28/2022 has been entered.

Allowable Subject Matter

3. Claims 1-17 are allowed.

4. The following is an examiner's statement of reasons for allowance: See pages 11-12 of applicant's argument filed on04/08/2022 regarding added limitation in the independent claims.

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."

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAWING CHAN whose telephone number is (571)270-3909. The examiner can normally be reached Mon-Fri 9am-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 published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KAWING CHAN/
Primary Examiner, Art Unit 2846

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	Art Unit
	KAWING CHAN	2846

CPC								
Symbol							Type	Version
H02P	/	4	/	00			F	2013-01-01
B60L	/	7	/	18			I	2013-01-01
B60L	/	15	/	20			I	2013-01-01
B60L	/	15	/	209			I	2013-01-01
B60L	/	15	/	2081			I	2013-01-01
B60L	/	50	/	40			I	2019-02-01
B60L	/	50	/	30			I	2019-02-01
B60L	/	50	/	51			I	2019-02-01
B60L	/	58	/	20			I	2019-02-01
B60L	/	50	/	64			I	2019-02-01
H02J	/	7	/	02			I	2013-01-01
B60L	/	15	/	38			I	2013-01-01
H02J	/	7	/	022			I	2020-01-01
H02K	/	17	/	02			I	2013-01-01
B60L	/	2240	/	421			A	2013-01-01
B60L	/	2240	/	423			A	2013-01-01
Y02T	/	90	/	16			A	2013-01-01
Y02T	/	10	/	64			A	2013-01-01
Y02T	/	10	/	70			A	2013-01-01
H02J	/	7	/	345			A	2013-01-01
Y02T	/	10	/	72			A	2013-01-01

CPC Combination Sets									
Symbol							Type	Set	Ranking	Version
	/		/							

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/KAWING CHAN/ Primary Examiner, Art Unit 2846	06 May 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220506

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
411 of 584

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	**Art Unit**
	KAWING CHAN	2846

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H02P4/00	/	4	/	00
B60L7/18	/	7	/	18
B60L15/20	/	15	/	20
B60L50/40	/	50	/	40
B60L50/30	/	50	/	30
B60L50/51	/	50	/	51
B60L58/20	/	58	/	20
B60L50/64	/	50	/	64

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	17	
/KAWING CHAN/ Primary Examiner, Art Unit 2846	06 May 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220506

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
412 of 584

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	**Art Unit**
	KAWING CHAN	2846

☑ 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		10												
	2		11												
	3		12												
	4		13												
	5		14												
	6		15												
	7		16												
	8		17												
	9														

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 17
/KAWING CHAN/ Primary Examiner, Art Unit 2846 (Primary Examiner) (Date) 06 May 2022	O.G. Print Claim(s): 1 O.G. Print Figure: 1

U.S. Patent and Trademark Office Part of Paper No.: 20220506

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
413 of 584

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	Art Unit
	KAWING CHAN	2846

CPC - Searched*		
Symbol	**Date**	**Examiner**
h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18	12/18/2021	KC
update search	02/15/2022	KC
update search	05/06/2022	KC

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
318	478	12/18/2021	KC
	update search	02/15/2022	KC
	update search	05/06/2022	KC

* 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**
Assignee and inventor search	12/18/2021	KC
IDS search	12/18/2021	KC
text search	12/18/2021	KC
update search	02/15/2022	KC
update search	05/06/2022	KC

/KAWING CHAN/ Primary Examiner, Art Unit 2846	

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
414 of 584

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/866,028	Zhou et al.
	Examiner	Art Unit
	KAWING CHAN	2846

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	see search history	05/06/2022	KC

/KAWING CHAN/ Primary Examiner, Art Unit 2846	

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
415 of 584

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"15453218"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 02:28 PM
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L3	24	("8138720"|"20040263099"|"20120010041"|"20120010771"|"7595597"|"7839013"|"7583053"|"8639423"|"9145131"|"20080218104"|"20100222953"|"5549172"|"7963353"|"8016061"|"20130041543"|"7688604"|"7965510"|"20100227722"|"20110057588"|"20120091930"|"20120292985"|"7764051"|"20090224720"|"20090242289").PN.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
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L5	17	L4 not L3	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:29 PM
L6	3871	(("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY")).AANM.	(USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L7	456	(("ZHOU") near3 ("Jian")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L8	110	(("XU") near3 ("Fei")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L9	267	(("LIU") near3 ("Dong")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L10	37	(("QIU") near3 ("Hai")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L11	67	(("KANG") near3 ("Pengju")).INV.	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/02/03 02:32 PM
L12	42719	energy near10 storage near10 system	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L13	2598	first near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L14	2223	second near5 ac near5 motor	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:32 PM
L15	23086	mechanical near5 torque	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 02:54 PM
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L19	43	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or	(US-PGPUB; USPAT)	SAME	ON	ON	2018/02/03 03:19 PM

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L20	12	L19 and (induction near5 motor)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:19 PM
L21	33	("2010/0222953").URPN.	(USPAT)	SAME	ON	ON	2018/02/03 03:26 PM
L22	5	"20100019729"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:31 PM
L23	6	"20120103749"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/02/03 03:40 PM
L24	3562	(power near5 split) transmission (motor or load or machine)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:32 AM
L25	40108	(planetary) transmission (motor or load or	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2018/09/01 10:33 AM

		machine)	JPO; DERWENT; IBM_TDB)				
L26	41872	L24 or L25	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L27	414	L26 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/09/01 10:33 AM
L28	45	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did.	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM
L29	28	L28 and transmission	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:09 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
419 of 584

L30	8	L28 and (cranking and start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:41 PM
L31	2	L28 and (cranking near5 start$3)	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 12:42 PM
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L33	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT)	SAME	ON	ON	2018/09/04 01:46 PM
L34	0	("20080197810"|"20090115375"|"20100240491"|"5343970"|"6118237"|"6209672"|"6271648"|"6554088"|"6583599"|"6608396"|"7285926"|"7594491"|"7723932"|"8395355"|"8415909"|"8469849"|"8535200")".PN."	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2018/09/04 01:46 PM
L35	1322	((cruising or accelerat$3) near10 mode) near50 ((both or second or first) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:38 AM
L36	17	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L37	23	"8387730".pn. or "9561719".pn. or "20030150352" or "20040069548" or "20060169548" or "20100219794" or "20110101915"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:39 AM
L38	4	"2004260904" or "2008312382"	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L39	0	L35 and (L37 or L38)	(EPO; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM
L40	56	(US-20130041543-$ or US-20120292985-$ or	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/15 06:40 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
420 of 584

		US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L41	4	L35 and L40	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:40 AM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
421 of 584

L42	710	L35 and (electric near10 vehicle)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:42 AM
L43	39	L42 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/15 06:43 AM
L44	1220	first near50 second near50 motor near50 (cruis$3 or accelerat$3) near50 generator	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L45	56	(US-20130041543-$ or US-20120292985-$ or US-20120091930-$ or US-20120010771-$ or US-20120010041-$ or US-20110057588-$ or US-20100227722-$ or US-20100222953-$ or US-20090242289-$ or US-20090224720-$ or US-20080218104-$ or US-20040263099-$ or US-20100240491-$ or US-20090115375-$ or US-20080197810-$ or US-20170174098-$ or US-20140152225-$ or US-20100019729-$ or US-20120103749-$ or US-20100219794-$ or US-20110101915-$ or US-20060169548-$ or US-20040069548-$ or US-20030150352-$).did. or (US-9145131-$ or US-8138720-$ or US-8639423-$ or US-7965510-$ or US-8016061-$ or US-7963353-$ or US-7839013-$ or US-7764051-$ or US-7595597-$ or US-7583053-$ or US-5549172-$ or US-7688604-$ or US-8535200-$ or US-8469849-$ or US-8415909-$ or US-8395355-$ or US-7723932-$ or US-7594491-$ or US-7285926-$ or US-6608396-$ or US-6583599-$ or US-	(US-PGPUB; USPAT; JPO; DERWENT)	SAME	ON	ON	2018/11/24 07:28 AM

		6271648-$ or US-6554088-$ or US-6209672-$ or US-6118237-$ or US-5343970-$).did. or (US-9561719-$ or US-8387730-$).did. or (JP-2008312382-$ or JP-2004260904-$).did. or (JP-2008312382-$ or JP-2004260904-$).did.					
L46	1	L44 and L45	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:28 AM
L47	111	L44 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:29 AM
L48	141	L44 and cruis$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L49	6	L48 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:30 AM
L50	7	"14094086"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 07:51 AM
L51	6276	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (motor or generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:27 AM
L52	8173	(cranking or accelerat$3) near50 (first near10 second near10 (motor or generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L53	642	L51 and L52	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L54	80	L53 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:28 AM
L55	900	(cruising or (constant near5 speed)) near20 ((first or second or mg1 or mg2) near10 (generator))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM

L56	2266	(cranking or accelerat$3) near50 (first near10 second near10 (generator or mg1 or mg2))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L57	87	L55 and L56	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2018/11/24 08:29 AM
L58	4	"20070007939" or "201000051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L59	10	"20070007939" or "20100051367"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:31 PM
L60	18739	318/500.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:45 PM
L61	23595	(cruising or (constant near5 speed) or uphill or accelerat$3) near20 ((first or second or mg1 or mg2) near10 (generator or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L62	8783	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:46 PM
L63	181	L62 and L60	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L64	761	L62 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:47 PM
L65	8557	(cranking or accelerat$3 or uphill) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:48 PM
L66	858	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L67	753	L65 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM

L68	24	L66 and "318".clas.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:49 PM
L69	3560	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L70	88	L66 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L71	191	L65 and L69	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L72	227	L70 or L71	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/03/03 10:54 PM
L73	2	"6691809".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:20 PM
L74	79	"2006042510" or "2000295711" or "2005297729" or "2002078106" or "2000013922" or "2002278105" or "2002067723" or "2002078110" or "2010130828"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/06/18 12:22 PM
L75	49472	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2019/09/27 12:30 AM
L76	1273	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2019/09/27 12:30 AM
L77	1	"16433348"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:30 AM
L78	17234	318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L79	67899	L75 or L76 or L78	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	SAME	ON	ON	2019/09/27 12:32 AM

			JPO; DERWENT; IBM_TDB)				
L80	3751	(motor near10 transmission) and ((motor) near10 split)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L81	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:32 AM
L82	9461	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L83	911	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:33 AM
L84	71	L79 and L81	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L85	89	L79 and L80	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L86	217	L79 and L82	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L87	283	L84 or L85 or L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2019/09/27 12:34 AM
L88	20	"20110074370" or "102010044497"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:16 AM
L89	76	"2117106"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:17 AM
L90	8	"2117106"	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:18 AM
L91	1	"7923866".pn.	(EPO; JPO; DERWENT)	SAME	ON	ON	2020/01/21 03:19 AM
L92	4	"7923866".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:19 AM
L93	13	("6608396" | "6710575"	(US-PGPUB; USPAT;	SAME	ON	ON	2020/01/21

		| "7750505" | "7795844" | "7847432").PN. OR ("7923866").URPN.	USOCR)				03:19 AM
L94	947	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:20 AM
L95	9774	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L96	1133	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:21 AM
L97	6	(L94 or L95) and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2020/01/21 03:22 AM
L98	29710	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 01:49 PM
L99	1668	((("ZHOU") near3 ("Jian")) OR (("XU") near3 ("Fei")) OR (("LIU") near3 ("Dong")) OR (("QIU") near3 ("Hai")) OR (("KANG") near3 ("Pengju"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	SAME	ON	ON	2021/12/18 01:49 PM
L100	53077	((("GENERAL") near3 ("ELECTRIC") near3 ("COMPANY"))).AS,AANM.	(USPAT)	SAME	ON	ON	2021/12/18 01:49 PM
L101	65	("20100219777"|"20120091930"|"6271648"|"7063637"|"7285926"|"8395355"|"8469849"|"8639423"|"20090015185"|"20040069548"|"20090115375"|"20140152225"|"5343970"|"7583053"|"7595597"|"7923866"|"20030150352"|"20040263099"|"20100051367"|"6118237"|"6554088"|"6691809"|"7207915"|"7723932"|"7839013"|"7963353"|"8138720"|"8387730"|"20050082992"|"20060169548"|"20090224	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:50 PM

		720"|"20110111909"|"20120010771"|"20120292985"|"20130041543"|"6209672"|"6608396"|"7594491"|"7688604"|"7965510"|"20060250902"|"20100240491"|"20120010041"|"5549172"|"6583599"|"9145131"|"9108501"|"20080197810"|"20080218104"|"20100019734"|"20100219794"|"20100222953"|"20120103749"|"8535200"|"20070007939"|"20090134820"|"7764051"|"8016061"|"8415909"|"9561719"|"10374529"|"20090242289"|"20100227722"|"20110057588"|"20110101915").PN.					
L102	0	vehicle near50 crusi$3 near50 motor near50 (second) near50 (uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L103	4961	vehicle near50 motor near50 (second) near50 (cruis$3 OR uphill OR accelerat$3)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L104	229	(98 OR 99 OR 100 OR 101) AND 103	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:52 PM
L105	52	vehicle near50 motor near50 both near50 first near50 (second) near50 ((cruis$3 OR uphill OR accelerat$3) near10 (mode OR state OR condition OR status))	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2021/12/18 01:57 PM
L106	78	((US-20120103749-A1 OR US-20190288616-A1 OR US-20090134820-A1 OR US-20100219777-A1 OR US-20050082992-A1 OR US-20130041543-A1 OR US-20100019729-A1 OR US-20140152225-A1 OR US-20170174098-A1 OR US-20090115375-A1 OR US-20050070401-A1 OR US-20100219794-A1 OR US-20110101915-A1 OR US-20060169548-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM

Petitioner EX1002
Toyota v. Bunker Hill IPR2026-00333
428 of 584

		A1 OR US-20040069548-A1 OR US-20030150352-A1 OR US-20100051367-A1 OR US-20070007939-A1 OR US-20040263099-A1 OR US-20120292985-A1 OR US-20120091930-A1 OR US-20120010771-A1 OR US-20120010041-A1 OR US-20110057588-A1 OR US-20100227722-A1 OR US-20100222953-A1 OR US-20090242289-A1 OR US-20090224720-A1 OR US-20080218104-A1 OR US-20110111909-A1 OR US-20100240491-A1 OR US-20100019734-A1 OR US-20080197810-A1 OR US-20090015185-A1 OR US-20060250902-A1).did. AND PGPB.dbnm.) OR ((US-10374529-B2 OR US-7923866-B2 OR US-10291158-B2 OR US-8630761-B2 OR US-5343970-A OR US-7595597-B2 OR US-8016061-B2 OR US-7965510-B2 OR US-6608396-B2 OR US-5549172-A OR US-6554088-B2 OR US-7688604-B2 OR US-9561719-B2 OR US-8387730-B2 OR US-7583053-B2 OR US-6691809-B2 OR US-9145131-B2 OR US-8138720-B2 OR US-8639423-B2 OR US-7963353-B2 OR US-7839013-B2 OR US-7764051-B2 OR US-9108501-B2 OR US-8535200-B2 OR US-8469849-B2 OR US-8415909-B2 OR US-8395355-B2 OR US-7723932-B2 OR US-					

		7594491-B2 OR US-7207915-B2 OR US-7285926-B2 OR US-7063637-B2 OR US-6583599-B1 OR US-6271648-B1 OR US-6118237-A OR US-6209672-B1).did. AND USPT.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A).did. AND JPAB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A OR DE-102010044497-A1).did. AND DWPI.dbnm.) OR ((KR-20110074370-A).did. AND FPRS.dbnm.) OR ((EP-2117106-A1).did. AND EPAB.dbnm.)					
L107	7	106 AND uphill	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 02:42 PM
L108	3	"16433348"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2021/12/18 03:00 PM
L109	19	"10374529"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR,	SAME	ON	ON	2021/12/18 03:22 PM

			HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L110	44064	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:18 PM
L111	78	((US-10374529-B2 OR US-8016061-B2 OR US-7595597-B2 OR US-5343970-A OR US-8630761-B2 OR US-10291158-B2 OR US-7923866-B2 OR US-7965510-B2 OR US-6608396-B2 OR US-5549172-A OR US-6554088-B2 OR US-7583053-B2 OR US-9145131-B2 OR US-8138720-B2 OR US-8639423-B2 OR US-7963353-B2 OR US-7839013-B2 OR US-7764051-B2 OR US-7688604-B2 OR US-9561719-B2 OR US-8387730-B2 OR US-6691809-B2 OR US-9108501-B2 OR US-8535200-B2 OR US-8469849-B2 OR US-8415909-B2 OR US-8395355-B2 OR US-7723932-B2 OR US-7594491-B2 OR US-7207915-B2 OR US-7285926-B2 OR US-7063637-B2 OR US-6583599-B1 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:18 PM

		6271648-B1 OR US-6118237-A OR US-6209672-B1).did. AND USPT.dbnm.) OR ((US-20130041543-A1 OR US-20090115375-A1 OR US-20170174098-A1 OR US-20140152225-A1 OR US-20100019729-A1 OR US-20120103749-A1 OR US-20050082992-A1 OR US-20100219777-A1 OR US-20090134820-A1 OR US-20190288616-A1 OR US-20050070401-A1 OR US-20040263099-A1 OR US-20120091930-A1 OR US-20120010771-A1 OR US-20120010041-A1 OR US-20110057588-A1 OR US-20100227722-A1 OR US-20100222953-A1 OR US-20090224720-A1 OR US-20080218104-A1 OR US-20030150352-A1 OR US-20090242289-A1 OR US-20100219794-A1 OR US-20110101915-A1 OR US-20060169548-A1 OR US-20040069548-A1 OR US-20120292985-A1 OR US-20100051367-A1 OR US-20070007939-A1 OR US-20110111909-A1 OR US-20100240491-A1 OR US-20100019734-A1 OR US-20080197810-A1 OR US-20090015185-A1 OR US-20060250902-A1).did. AND PGPB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A).did. AND JPAB.dbnm.) OR ((JP-2008312382-A OR JP-2004260904-A OR DE-102010044497-					

		A1).did. AND DWPI.dbnm.) OR ((KR-20110074370-A).did. AND FPRS.dbnm.) OR ((EP-2117106-A1).did. AND EPAB.dbnm.)					
L112	773	(6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 110 OR 111) AND 103	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/02/15 12:19 PM
L113	225	(6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 110 OR 111) AND 103	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2022/02/15 12:20 PM
L114	1	("2005/0070401").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/05 09:51 AM
L115	6	("6776739" | "20030073540" | "20050070401" | "20090227409" | "20150051767" | "20150280565").pn. OR ("11198426").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/05/05 09:51 AM
L116	7900	(318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.)	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2022/05/06 10:39 AM
L117	45227	318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DK, EA, EE, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	SAME	ON	ON	2022/05/06 10:39 AM

L118	52	(vehicle near50 motor near50 both near50 first near50 (second) near50 ((cruis$3 OR uphill OR accelerat$3) near10 (mode OR state OR condition OR status)))	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2022/05/06 10:40 AM
L119	5	117 AND 118	(US-PGPUB; USPAT; USOCR)	SAME	ON	ON	2022/05/06 10:40 AM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N98	5735	(cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N99	733	(cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:20 AM
N100	305	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.) and @pd>"20190727"	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:21 AM
N101	5	(N98 or N99) and N100	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N102	376	N98 and N99	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N103	5383	(318/478.ccls. or (h02p4/00 or b60l50/30 or b60l50/64 or b60l7/18).cpc.)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N104	53	N102 and N103	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:23 AM
N105	2001	((cranking or accelerat$3 or uphill or cruis$3) near50 (first near10 second near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N106	146	((cruis$3) near50 ((first or second) near10 (generator or mg1 or mg2 or motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:24 AM
N107	298	(N105 or N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM
N108	7	(N105 and N106) and ("318".clas. or N103)	(US-PGPUB; USPAT)	SAME	ON	ON	2020/01/21 03:27 AM

N109	167	((cruis$3) near60 ((first OR second) near10 (generator OR mg1 OR mg2 OR motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2022/05/06 10:41 AM
N110	2119	((cranking OR accelerat$3 OR uphill OR cruis$3) near60 (first near10 second near10 (generator OR mg1 OR mg2 OR motor))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2022/05/06 10:41 AM
N111	7623	318/478.ccls. OR (h02p4/00 OR b60l50/30 OR b60l50/64 OR b60l7/18).cpc.	(US-PGPUB; USPAT)	SAME	ON	ON	2022/05/06 10:42 AM
N112	273	(N109 OR N110) AND (318.clas. OR N111)	(US-PGPUB; USPAT)	SAME	ON	ON	2022/05/06 10:42 AM
N113	16	(vehicle near50 motor near50 both near50 first near50 (second) near50 ((cruis$3 OR uphill OR accelerat$3) near10 (mode OR state OR condition OR status))).clm.	(US-PGPUB; USPAT)	SAME	ON	ON	2022/05/06 10:55 PM

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 05/13/2022
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.
16/866,028	05/04/2020	Jian Zhou	256975-US-11	1053

TITLE OF INVENTION: ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	08/15/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHAN, KAWING	2846	318-478000

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 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 GOLDBERG & LIAO, LLP
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: 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 /Frank Liao/ Date 2022-05-23

Typed or printed name FRANK LIAO Registration No. 40065

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

Electronic Patent Application Fee Transmittal

Application Number:	16866028
Filing Date:	04-May-2020
Title of Invention:	ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD
First Named Inventor/Applicant Name:	Jian Zhou
Filer:	Frank Y. Liao/Tammy Ehrhart
Attorney Docket Number:	256975-US-11

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	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt

EFS ID:	45777465
Application Number:	16866028
International Application Number:	
Confirmation Number:	1053
Title of Invention:	ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD
First Named Inventor/Applicant Name:	Jian Zhou
Customer Number:	131278
Filer:	Frank Y. Liao/Tammy Ehrhart
Filer Authorized By:	Frank Y. Liao
Attorney Docket Number:	256975-US-11
Receipt Date:	23-MAY-2022
Filing Date:	04-MAY-2020
Time Stamp:	14:07:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E20225ME08213532
Deposit Account	505522
Authorized User	Tammy Ehrhart
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)	256975US11-IssueFee.pdf	84432 7f4501f7d128c3cba977ffe306472797ae48e05b	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37911 4f3b4a00c466b2ab2c23cb4c4cf7836ff784c11a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	122343		

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/866,028	06/28/2022	11374508	256975-US-11	1053

131278 7590 06/08/2022

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 173 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 Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

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

Jian Zhou, Shanghai, CHINA;
Fei Xu, Shanghai, CHINA;
Dong Liu, Shanghai, CHINA;
Hai Qiu, Shanghai, CHINA;
Pengju Kang, Yorktown Heights, NY;

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

General Electric Company, Schenectady, 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.

IR103 (Rev. 10/09)

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	16/866,028
Title of Invention	ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD	

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.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	256975-US-11
	Application Number	16/866,028
Title of Invention	ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD	

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)	2025-07-08
First Name	Tarek	Last Name	Fahmi	Registration Number	41402

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

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/866,028	**07/08/2025 06:05:13 PM Z ET**	**256975-US-11**

Title of Invention

ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11374508
CONFIRMATION #	1053	FILED BY	SARAH ZIZZO
PATENT CENTER #	71272089	FILING DATE	05/04/2020
CUSTOMER #	131278	FIRST NAMED INVENTOR	Jian Zhou
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
16866028_Statement_3-73c.pdf	3	Assignee showing of ownership per 37 CFR 3.73	120 KB
16866028_ADS_GE_both.pdf	2	Application Data Sheet	155 KB

Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Edison_Exe_POA.pdf	70037A4FECD2A63822F4A656346D25696299CADFD63189BBD

	FE124E26BB75CEEB71D3AB5B008D49AAB79E187DD66B1BB FCBCDA44980A8741C98797B48E0C70E6
16866028_Statement_3-73c.pdf	045572A3B8C47C54FAD16D170C1923EBFD13C18E39CED2C7 8C8908A76C874BE920F0BD002175F67B89D86639B267C1ED7 9A91E153256AA54F280879ADC305D8B
16866028_ADS_GE_both.pdf	98A1B96967EC839E2CFB728CA51E711403882FFFD0EB6A971 C43574273BF8F021AF037516582C397B6FDF6216C9B6407EB2 30D3BE4DA58A123C5F7ACA1F61773

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 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.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and TrademarkOffice; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork ReductionAct of 1995, no personsare required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: EDISON INNOVATIONS, LLC

Application No./Patent No.: 11,374,508 Filed/Issue Date: 06/28/2022

Titled: ELECTRIC DRIVE SYSTEM AND ENERGY MANAGEMENT METHOD

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: ZHOU, JIAN; et al. To: GENERAL ELECTRIC COMPANY

The document was recorded in the United States Patent and Trademark Office at
Reel 052573, Frame 0375, 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**

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

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. 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 displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

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
Reel 070643, Frame 0907, or for which a copy thereof is attached.

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

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/	2025-07-08
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.

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 tracitive effort	Dolby Intellectual Property Licensing, LLC	Expired
133987-FR-12	FR	11/18/2004	EP04811389A	EP1697158	10/17/2007	Method and apparatus for producing tracitive 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 tracitive 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	IN5468DEN2008A	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	JP2012108971A	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	JP2017050687A	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	JP2008549486A	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	AU2008202309A	AU2008202309	11/20/2014	Method and apparatus for assembling photovoltaic modules	Dolby Intellectual Property Licensing, LLC	Active
187674-CN-4	CN	5/26/2008	CN200810108828A	CN101320759	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	US7332835	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	KR101468743	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	KR101409119	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	MX2007014563	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
219869-JP-6	JP	5/7/2008	JP2010512231A	JP5570976	8/13/2014	Energy storage device and cell structure thereof	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN101746606	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN101874333	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN101815354	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR101519143	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN10173095 6	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	CN10143649 0	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	JP2012514124A	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 optimization 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	JP2010051225A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN200910209818A	CN101729020	12/24/2014	Apparatus for energy transfer using converter and method of manufacturing same	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN201110093490A	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	EP11160077A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
238115-CN-2	CN	1/13/2011	CN201110025103A	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	JP2011103930A	JP5802050	10/28/2015	Dielectric materials for power transmission systems	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
238312-SG-14	SG	5/12/2011	SG2011034204A	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	CN201010262686A	CN101995433	3/12/2014	Apparatus and method for bearing condition monitoring	Dolby Intellectual Property Licensing, LLC	Active
238346-JP-4	JP	8/13/2010	JP2010181183A	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	CN201110062345A	CN102158917	6/8/2016	Switching between different vocoder systems	Dolby Intellectual Property Licensing, LLC	Active
238413-KR-4	KR	2/1/2011	KR20110009998A	KR101256316	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	CN201110064382A	CN102195806	8/17/2016	Switching for many transmission technologys is measured	Dolby Intellectual Property Licensing, LLC	Active
238414-KR-4	KR	3/10/2011	KR20110021549A	KR101787754	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	CN201110280532A	CN102377333	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	IN1975DE2011A	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	JP2011154366A	JP6088126	3/1/2017	Apparatus and system for power conversion	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	EP111193469A	EP2468928	1/26/2022	Manufacturing method	Dolby Intellectual Property Licensing, LLC	Active
238780-EP-3	EP	12/14/2011	EP111193469A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 nonsinusoidial 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	IN191ZDE2011A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR101889551	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	IN414DE2011A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
241843-DE-5	DE	6/14/2011	EP11169822A	EP2398028	8/12/2015	Mems 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	Mems 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	Mems 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	CN201210553524A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN201110381828A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 permanent 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 permanent 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	CN102904168	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	CN102457089	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN106356572	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	SG10201405993WA	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	BR1020120006427	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 auxilary	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	JP6105938	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	Recahrgeable 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	Recahrgeable 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	Recahrgeable 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	Recahrgeable 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	Recahrgeable 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN102982756	10/17/2017	Personage tracks and interactive advertisement	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 cccle 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN10298356 6	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	CN10687734 1	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	KR10199841 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	BR10201301 2941	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	BR10201301 2938	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR101625449	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	BR1020140054755	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN201380067381A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR20157008947A	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 method 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 permanent 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 permanent 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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-EP-2	EP	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	EP18210654A	EP3502690	9/7/2022	Platelet activation and growth factor release using electric pulses	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR102277931	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR102213731	2/8/2021	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-KR-18	KR	11/20/2014	KR20217002961A	KR102255951	5/25/2021	Electric pulse generation systems using capacitive coupling	Dolby Intellectual Property Licensing, LLC	Active
269603-MX-8	MX	11/20/2014	MX2016009314A	MX2016009314	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	BR102014025123	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	CN104578651	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	KR102302513	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	IN2308CH201 4A	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	JP2015101614 A	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	KR201500720 36A	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	CN201410747 549A	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	JP2015235294 A	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	CN201410582 236A	CN10563422 9	1/8/2019	Magneto	Dolby Intellectual Property Licensing, LLC	Active
271474-CN-3	CN	7/21/2016	CN201680051 061A	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	IN201847009 47A	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	CN201510432 791A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	BR102016000601A	BR1020160000601	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	MX2016012012	12/7/2016	System architecture for wireless metrological devices.	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN201410581804A	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	CA2907232A	CA2907232	4/4/2023	System and method for contactless power transfer	Dolby Intellectual Property Licensing, LLC	Active
275187-CN-4	CN	10/9/2015	CN201510647562A	CN105515217	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR101940366	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	CN105509639	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	JP2015183536A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	BR102016007005	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	KR102493179	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 administraÇÃo tÃ“pica, mÃ‰todo de imageamento de proteÃna 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	BR1020160230076	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	IN201644035756A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	IN201641006028A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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-5	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	US10749385	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR102671144	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	CN110999055	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	KR102581266	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	CN111032319	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	KR102386096	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR20207003486A	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	KR20207013539A	KR20200057090	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN111801927	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
324680-EP-3	EP	9/25/2019	EP19865020A	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	CN201980024991A	CN111937272	11/13/2020	Receiver unit for wireless power transmission system	Dolby Intellectual Property Licensing, LLC	Active
324845-IN-1	IN	4/19/2018	IN201841014948A	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	TW108113031A	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	TW112128545A	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	CN202080025845A	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	CN202310994966A	CN117025197	11/10/2023	åç¢žå¼ºç£·å…‰ä½“ç¨³å®šæ€§å'Œå¯†æ•£æ€§çš„æ–¹æ³•å æ‰€å¾—ç£·å…‰ä½“	Dolby Intellectual Property Licensing, LLC	Active
502201-EP-4	EP	4/20/2020	EP20809356A	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	JP2021560923A	JP2022533904	7/27/2022	è›å…‰ä½“ç¨³å®šæ€§å ‚ç‰æ€§çšå‰ã‚ˆã³å¯†æ•£æ€§ã,'é«˜ã,‹æ–¹æ³•ã,‰ã¤ãªã,‰ã,Œã,‹è›å…‰ä½“	Dolby Intellectual Property Licensing, LLC	Active
502201-KR-6	KR	4/20/2020	KR20217041809A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN202080084415A	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	EP20899397A	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‹¡å¼µã•ã‚Œã‰²åŸŸã‚’æŒãƒ‡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	CN202180042068A	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	EP21788285A	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	CN202180042076A	CN115667457	1/31/2023	Green light emitting phosphor and device thereof	Dolby Intellectual Property Licensing, LLC	Active
509730-EP-7	EP	4/13/2021	EP21788570A	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	KR20220164603	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 lcd 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	ã¿ƒè¿›å·¥ä¸šæ•°æ®é©±åŠ¨çš„æ™ºèƒ½åˆ¶é€ è¯„估ä¸å¹³å°æŠ€æœ¯	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©ãƒªã,¦ãƒ ã,¤ã,ªãƒ³ãƒ–ãƒªãƒƒãƒ‰ææ–™	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR20220111153A	KR102596919	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	KR20100001089A	KR101618799	5/9/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-2	KR	1/7/2010	KR20100001090A	KR101618800	5/9/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-3	KR	1/7/2010	KR20100001204A	KR101615277	4/25/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-4	KR	1/7/2010	KR20100001205A	KR101615283	4/25/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-5	KR	1/7/2010	KR20100001408A	KR101623952	5/24/2016	Light emitting diode having electrode pads	Dolby Intellectual Property Licensing, LLC	Active
610773-KR-6	KR	1/8/2010	KR20100001813A	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	2.0241E+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 FORMERMODULE AND METHOD OF MAKING THE SAME	Dolby Intellectual Property Licensing, LLC	Active

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 DU 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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	2.0071E+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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	US2007/0231826		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	DE102006017097A1		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	US2007/0152238		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	WO2007/081495		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	TWNI327724	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
176918-CA-11	Canada	3/15/2006	2783963	CA2783963	10/7/2014	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-TH-12	Thailand	3/15/2006	601001199	TH39489	4/1/2014	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-MY-13	Malaysia	3/15/2006	PI20061158	MY142083A	8/30/2010	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-14	European Patent	3/15/2006	6738323.2	EP1869510	5/15/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-IL-15	Israel	3/15/2006	185973	IL185973	5/28/2014	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-N●-16	Norway	3/16/2006	20075284	NO338315	8/8/2016	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-RU-17	Russian Federation		2007138218	RU2459284	8/20/2012	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-SG-18	Singapore	3/15/2006	200708432-0	SG135654	3/31/2010	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-TH-19	Thailand	11/22/2007	701004721	TH97812		DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-W●-20	Patent Cooperation Treaty		PCT/US2007/ 020263			DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-CN-21	China	3/15/2006	2.0068E+11	CN200680017070.1	4/25/2012	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-BR-22	Brazil	3/15/2006	PI0608713-2			SINGLE-BIT MICR●-H●L●GRAMS AND A THRESH●LD 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 ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-CA-24	Canada	9/19/2007	2663380	CA2663380	11/3/2015	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-25	European Patent	3/11/2009	7838470.8	EP2064599	5/8/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-JP-26	Japan	9/19/2007	2009-528346	JP5227322	3/22/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-RU-27	Russian Federation	9/19/2007	2009114712	RU2437134	12/20/2011	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-MX-28	Mexico	3/15/2006	MX/a/2007/01 1497			SINGLE-BIT MICR●-H●L●GRAMS AND A THRESH●LD MATERIAL	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-29	European Patent	9/11/2012	12183883.3	EP2535777	1/8/2014	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-EP-30	European Patent	9/11/2012	12183884.1	EP2535778	4/2/2014	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-DE-31	Germany (Federal Republic of)	3/11/2009	7838470.8	DE2064599	5/8/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-GB-32	United Kingdom	3/11/2009	7838470.8	GB2064599	5/8/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired
176918-NL-33	Netherlands	3/11/2009	7838470.8	NL2064599	5/8/2013	DATA ST●RAGE DEVICES AND METH●DS	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
219867-RU-12	Russian Federation	8/27/2009	2011108407			ENERGY ST●RAGE DEVICE AND SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
219867-CN-14	China	8/27/2009	2.0131E+11	CN103219500A		C●MP●SITI●N ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-1	United States of America	12/19/2006	60/870843			ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-2	United States of America	6/15/2007	11/763787			C●PPER-BASED ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-W●-4	Patent Cooperation Treaty	11/20/2007	US07/85243	W●2008079563		C●PPER-BASED ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-5	United States of America	5/28/2009	12/473353			ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-US-6	United States of America	5/28/2009	12/473361			ENERGY ST●RAGE 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 ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-CH-8	Switzerland	11/20/2007	00925/09	CH698359	5/31/2012	ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-CN-9	China	11/20/2007	2.0078E+11	CN101563797A		C●PPER-BASED ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-JP-10	Japan	11/20/2007	2009-543005	JP2010514142		ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-CH-11	Switzerland		2072/10	CH704630	9/28/2012	ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219868-CN-12	China	11/20/2007	2.0111E+11			ENERGY ST●RAGE DEVICE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired
219869-W●-2	Patent Cooperation Treaty	5/7/2008	US08/62843			ENERGY ST●RAGE DEVICE AND CELL C●NFIGURATI●N THEREF●R	Dolby Intellectual Property Licensing, LLC	Expired
220217-W●-2	Patent Cooperation Treaty	3/17/2008	US08/57192	W●2008/137215		SYSTEM AND METH●D F●R C●●LING 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 METH●D F●R C●●LING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220217-EP-4	European Patent	3/17/2008	8743951.9	EP2155513		SYSTEM AND METH●D F●R C●●LING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220217-JP-5	Japan	3/17/2008	2010-507492	JP5271351	5/17/2013	SYSTEM AND METH●D F●R C●●LING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220219-W●-2	Patent Cooperation Treaty	3/17/2008	US08/57188			SYSTEM AND METH●D F●R C●●LING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220219-EP-4	European Patent	3/17/2008	8732331.7	EP2147475	11/29/2017	SYSTEM F●R C●●LING A BATTERY	Dolby Intellectual Property Licensing, LLC	Expired
220778-CA-2	Canada	12/11/2008	2647126			MEMS SWITCH WITH IMPR●VED STAND●FF V●LTAGE C●NTR●L	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 Republicof)	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 Republicof)	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
220887-W●-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	MICR●-ELECTR●MECHANICAL SYSTEM BASED SWITCHING IN HEATING-VENTILATI●N-AIR-C●NDITI●NING SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
221845-W●-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	MICR●-ELECTR●MECHANICAL SYSTEM BASED SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
221845-KR-6	Korea, Republic of (KR)	12/15/2009	2009-7026190	KRW●08/153574		MICR●-ELECTR●MECHANICAL SYSTEM BASED SWITCHING	Dolby Intellectual Property Licensing, LLC	Expired
222841-US-1	United States of America	6/22/2007	60/945715			PR●CESS F●R PREPARATI●N ●F METAL ●XIDES	Dolby Intellectual Property Licensing, LLC	Expired
222841-IN-6	India	10/31/2008	2472/DEL/2008			METAL ●XIDE C●ATINGS	Dolby Intellectual Property Licensing, LLC	Expired
224610-W●-2	Patent Cooperation Treaty	6/20/2007	PCT/US07/014363	W●2008156449		RESETTABLE MEMS MICR●-SWITCH ARRAY BASED ●N CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224610-EP-4	European Patent	6/20/2007	7796290	EP2162891	8/12/2015	RESETTABLE MEMS MICR●-SWITCH ARRAY BASED ●N CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224610-JP-5	Japan	6/20/2007	2010-513168	JP5002708	5/25/2012	RESETTABLE MEMS MICR●-SWITCH ARRAY BASED ●N CURRENT LIMITING APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-W●-2	Patent Cooperation Treaty	6/20/2007	US07/14379	WO2008/153530		REM●TE-●PERABLE MICR●-ELECTR●MECHANICAL SYSTEM BASED ●VER-CURRENT PR●TECTI●N APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-EP-4	European Patent	6/20/2007	7835836.3	EP2162964	3/21/2018	REM●TE-●PERABLE MICR●-ELECTR●MECHANICAL SYSTEM BASED ●VER-CURRENT PR●TECTI●N APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
224631-KR-6	Korea, Republic of (KR)	6/20/2007	1.0201E+12	KR102010021481A		REM●TE-●PERABLE MICR●-ELECTR●MECHANICAL SYSTEM BASED ●VER-CURRENT PR●TECTI●N APPARATUS	Dolby Intellectual Property Licensing, LLC	Expired
225009-W●-4	Patent Cooperation Treaty	4/10/2008	US08/59839			PR●PULSI●N SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
225009-W●-5	Patent Cooperation Treaty	4/10/2008	US08/59840	W●2008/137247		METH●D ●F ●PERATING PR●PULSI●N SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
225009-W●-6	Patent Cooperation Treaty	4/10/2008	US08/59843	WO2008/137248		ELECTRIC DRIVE VEHICLE RETR●FIT SYSTEM AND ASS●CIATED METH●D	Dolby Intellectual Property Licensing, LLC	Expired
225009-AU-12	Australia	4/10/2008	2008247962			METH●D ●F ●PERATING PR●PULSI●N 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
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	JPWO08/1372248		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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
226893-DE-1	Germany (Federal Republic of)	10/11/2007	2007049036	DE102007049036	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	DE20080018626.1	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
228365-US-3	United States of America	12/13/2010	12/966144	US0080823		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	CN20098015 3821.6	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	IN4477DEL NP2011		DISC STRUCTURE FOR BIT-WISE HOLOGRAPHIC STORAGE	Dolby Intellectual Property Licensing, LLC	Expired
228365-JP-8	Japan	12/16/2009	2011-543581	JP20125142 85		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	WO 2008/090344		CATHODE FOR AN ELECTROCHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
230537-US-1	United States of America	8/28/2009	12/549877	US20110052 968A1		BATTERY PACK ASSEMBLY AND RELATED PROCESSES	Dolby Intellectual Property Licensing, LLC	Expired
230537-WO-2	Patent Cooperation Treaty	7/13/2010	US10/41766	WO2011/025 594		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	JP20122385 86		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	WO 2010/126648		CATHODE COMPOSITION AND ELECTROCHEMICAL CELL COMPRISING SAME	Dolby Intellectual Property Licensing, LLC	Expired
232652-WO-2	Patent Cooperation Treaty	7/2/2009	US09/49537	WO2010/011 484		METHOD AND SYSTEM FOR CONTROL OF A VEHICLE ENERGY STORAGE DEVICE	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	JP2010136614		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	JP2010173630		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	US2010/0310456		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	JP2011040385		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	JP2010188994		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	US20100240491A1		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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
235714-W●-2	Patent Cooperation Treaty		US10/48750	W●2011/056297		CATH●DE C●MP●SITI●NS C●MPRISING ZN AND CHALC●GENIDE AND ENERGY ST●RAGE CELL C●MPRISING SAME	Dolby Intellectual Property Licensing, LLC	Expired
235783-AU-2	Australia	7/22/2010	2010203140			PR●TECTIVE C●ATING C●MP●SITI●NS AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
235783-EP-4	European Patent	7/20/2010	10170065.6	EP2302006	11/28/2012	PR●TECTIVE C●ATING C●MP●SITI●NS AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
236159-US-2	United States of America	2/25/2010	12/712457	US0206984		PRESEALED AN●DE TUBE	Dolby Intellectual Property Licensing, LLC	Expired
236639-CN-2	China	8/31/2010	2.0101E+11	CN102005222B	7/23/2014	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-EP-3	European Patent	8/19/2010	10173473.9	EP2290408	8/15/2012	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-JP-4	Japan	8/20/2010	2010-184512	JP5738554	5/1/2015	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-KR-5	Korea, Republic of (KR)	8/30/2010	1.0201E+12	KR102011023822A		C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-TW-6	Taiwan	8/30/2010	99129150	TWI500025	9/11/2015	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-DE-8	Germany (Federal Republic of)	8/19/2010	10173473.9	DE2290408	8/15/2012	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-GB-9	United Kingdom	8/19/2010	10173473.9	GB2290408	8/15/2012	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236639-NL-10	Netherlands	8/19/2010	10173473.9	NL2290408	8/15/2012	C●MP●SITI●NS, ●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE ●PTICAL DATA ST●RAGE MEDIA	Dolby Intellectual Property Licensing, LLC	Expired
236909-EP-3	European Patent	7/6/2010	10168517	EP2273520		TRANSF●RMER ●N-L●AD TAP CHANGER USING MEMS TECHN●L●GY	Dolby Intellectual Property Licensing, LLC	Expired
237446-US-1	United States of America	9/16/2009	61/242819			METH●D AND SYSTEM F●R C●NTACTLESS FINGERPRINT DETECTI●N AND VERIFICATI●N	Dolby Intellectual Property Licensing, LLC	Expired
237714-EP-4	European Patent	3/28/2011	11160074.8	EP2434614	6/19/2013	C●NTR●L DISTRIBUTI●N TRANSF●RMER AND METH●D ●F MAKING SAME	Dolby Intellectual Property Licensing, LLC	Expired
237735-W●-2	Patent Cooperation Treaty	6/18/2010	US10/39122	WO2011/025574		ELECTR●CHEMICAL CELL	Dolby Intellectual Property Licensing, LLC	Expired
237851-EP-3	European Patent	3/28/2011	11160077.1	EP2371646	11/29/2017	APPARATUS F●R HYBRID DRIVE T●RQUE C●NTR●L	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
237934-US-1	United States of America	8/18/2009	12/542760	US20100139733A1		FUSED WIRING HARNESS F●R A PH●T●V●LTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-AU-2	Australia	8/18/2010	2010212421			FUSED WIRING HARNESS F●R A PH●T●V●LTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-CN-3	China	8/18/2010	2.010IE+11	CN101997241A		FUSED WIRING HARNESS F●R A PH●T●V●LTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
237934-EP-4	European Patent	8/3/2010	10171761.9	EP2287915	1/9/2013	FUSED WIRING HARNESS F●R A PH●T●V●LTAIC SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-EP-5	European Patent	5/6/2011	11165079.2	EP2392553	8/24/2016	DIELECTRIC MATERIALS F●R P●WER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-SG-8	Singapore	5/12/2011	201103421-2	SG176379		DIELECTRIC MATERIALS F●R P●WER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238312-EP-11	European Patent	5/6/2011	11165080	EP2386531	11/9/2016	DIELECTRIC MATERIALS F●R P●WER TRANSFER SYSTEM	Dolby Intellectual Property Licensing, LLC	Expired
238346-EP-3	European Patent	8/2/2010	10171542.3	EP2288000		APPARATUS AND METH●D F●R BEARING	Dolby Intellectual Property Licensing, LLC	Expired
238407-EP-2	European Patent	8/19/2010	10173474.7	EP2290650	11/28/2012	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-TW-3	Taiwan	8/19/2010	99127813	TW524337	3/1/2016	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-CN-4	China	8/31/2010	201010277335.X	CN201010277335.X	5/13/2015	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-JP-5	Japan	8/24/2010	2010-186776	JP5496823	3/14/2014	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R 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	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R 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	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-FR-9	France	8/19/2010	10173474.7	FR2290650	11/28/2012	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238407-GB-10	United Kingdom	8/19/2010	10173474.7	GB2290650	11/28/2012	●PTICAL DATA ST●RAGE MEDIA AND METH●DS F●R USING THE SAME	Dolby Intellectual Property Licensing, LLC	Expired
238413-EP-3	European Patent	1/28/2011	11152533.3	EP2355096		HAND●FFS BETWEEN DIFFERENT V●ICE ENC●DER SYSTEMS	Dolby Intellectual Property Licensing, LLC	Expired
238414-EP-3	European Patent	3/8/2011	11157344	EP2365712		HAND●FF METRIC F●R MULTIPLE TRANSMISSI●N TECHN●L●GIES	Dolby Intellectual Property Licensing, LLC	Expired
238727-W●-2	Patent Cooperation Treaty	11/10/2010	PCT/US10/56099	WO2011/081717		ENERGY ST●RAGE 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 METH●D	Dolby Intellectual Property Licensing, LLC	Expired
238794-JP-4	Japan	9/9/2010	2010-201497	JP2011091029		SWITCH STRUCTURE AND METH●D	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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
241843-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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	2.011 IE+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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 110533		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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	US20130134018Al		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	JP5953097	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	KR102013121360A		OPTIMAL GRADIENT PURSUIT FOR IMAGE ALIGNMENT	Dolby Intellectual Property Licensing, LLC	Expired
250455-US-1	United States of America	12/30/2011	13/341052	US20130171487Al		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	WO2013/101411		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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	US20130316226Al		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	KR102013132293A		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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	2.0121E+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	102014005311-5	BR1020140053311		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	112015005541-9			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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	CN110224567X		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/US15/057308	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 MANUFACTURINGTHEREOF	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	2.0141E+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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	EP3045344		VEHICLE DRIVING SYSTEM AND ENERGY CONTROL METHODS	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	WO2017/039860		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 US16/050706	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	US20170282310Al		EUTECTIC BRAZING COMPOSITIONS, AND RELATED PROCESSES AND DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
281127-WO-2	Patent Cooperation Treaty	7/20/2016	PCT/US16/043035	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
314859-W●-2	Patent Cooperation Treaty	10/20/2017	PCT/US17/57513	WO2018111400		DC LEAKAGE CURRENT DETECT●R AND METH●D ●F ●PERATI●N THERE●F F●R LEAKAGE CURRENT DETECTI●N IN DC P●WER 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-W●-2	Patent Cooperation Treaty	10/28/2017	PCT/US17/58907	WO2018111421		CHARGING PADS AND METH●DS F●R 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			METH●DS ●F SYSTEMS ●F GENERATING VIRTUAL MULTI-DIMENSI●NAL M●DELS USING IMAGE ANALYSIS	Dolby Intellectual Property Licensing, LLC	Expired
315233-W●-3	Patent Cooperation Treaty	10/27/2017	PCT/US2017/58825	W●2018081607		Methods for using synthetic data in deep-learning-based image analysis	Dolby Intellectual Property Licensing, LLC	Expired
315343A-W●-2	Patent Cooperation Treaty	1/12/2018	PCT/US2018/013499			SYSTEM AND METH●D F●R PREDICTING AN EXCITATI●N PATTERN ●F A DEEP BRAIN STIMULATI●N	Dolby Intellectual Property Licensing, LLC	Expired
315343-W●-2	Patent Cooperation Treaty	1/12/2018	PCT/US2018/013498			SYSTEM AND METH●D F●R PREDICTING AN EXCITATI●N PATTERN ●F A DEEP BRAIN STIMULATI●N	Dolby Intellectual Property Licensing, LLC	Expired
315659-W●-2	Patent Cooperation Treaty	10/27/2017	PCT/US2017/058641	W●2018111416		A CHARGING PAD AND A METH●D F●R CHARGING ●NE ●R M●RE RECEIVER DEVICES	Dolby Intellectual Property Licensing, LLC	Expired
316496-EP-2	European Patent	12/1/2017	17204871.2	EP3333764		TECHNIQUES F●R ASSESSING GR●UP LEVEL C●GNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-JP-3	Japan	11/22/2017	2017-224121			TECHNIQUES F●R ASSESSING GR●UP LEVEL C●GNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-CN-4	China	12/6/2017	2.01711E+11	CN108154236		TECHNIQUES F●R ASSESSING GR●UP LEVEL C●GNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316496-CA-5	Canada	11/22/2017	2986406			TECHNIQUES F●R ASSESSING GR●UP LEVEL C●GNITIVE STATES	Dolby Intellectual Property Licensing, LLC	Expired
316767-W●-2	Patent Cooperation Treaty	2/6/2018	PCT/US18/16964	WO2018/160324		DRIVE SYSTEM AND METH●D ●F ●PERATI●N THERE●F F●R REDUCING DC LINK CURRENT RIPPLE	Dolby Intellectual Property Licensing, LLC	Expired
316772-W●-2	Patent Cooperation Treaty	3/16/2018	PCT/US2018/022999	W●2018212828		DUAL MAGNETIC PHASE MATERIAL RINGS F●R AC ELECTRIC MACHINES	Dolby Intellectual Property Licensing, LLC	Expired
317124-EP-2	European Patent	10/2/2017	17194461.4	EP3333762		CR●WD ANALYTICS VIA ●NE SH●T LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-JP-3	Japan	9/25/2017	2017-183113			CR●WD ANALYTICS VIA ●NE SH●T LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-CN-4	China	10/9/2017	2.01711E+11	CN108154075		CR●WD ANALYTICS VIA ●NE SH●T LEARNING	Dolby Intellectual Property Licensing, LLC	Expired
317124-CA-5	Canada	9/28/2017	2980609			CR●WD ANALYTICS VIA ●NE SH●T LEARNING	Dolby Intellectual Property Licensing, LLC	Expired

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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	3/27/2017	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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/US2021/23009	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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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

Patent / Application Reference	Publication Country	File date	Application Number	Patent/ Publication Number	Publication Date	Title	Current Assignee	Status
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 365		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 433 Al		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	EP15163078 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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/866,028	05/04/2020	Jian Zhou	256975-US-11

CONFIRMATION NO. 1053

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POWER OF ATTORNEY NOTICE

OC000000092278628

Date Mailed: 07/30/2025

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/08/2025.

- 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**.

/lchau/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/866,028	05/04/2020	Jian Zhou	256975-US-11

CONFIRMATION NO. 1053

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POA ACCEPTANCE LETTER

OC000000092278686

Date Mailed: 07/30/2025

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/08/2025.

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**.

/lchau/