PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

Assignment ID: PATI672267

SUBMISSION TYPE:	RESUBMISSION
NATURE OF CONVEYANCE:	ASSIGNMENT
RESUBMIT DOCUMENT ID:	508877205

CONVEYING PARTY DATA

Name	Execution Date
Medtronic, Inc.	11/08/2024

RECEIVING PARTY DATA

Company Name:	Boston Scientific Scimed, Inc.
Street Address:	One Scimed Place
City:	Maple Grove
State/Country:	MINNESOTA
Postal Code:	55311

PROPERTY NUMBERS Total: 32

Property Type	Number
Application Number:	15930491
Application Number:	16796017
Application Number:	16841904
Application Number:	16885363
Application Number:	17097375
Application Number:	17114720
Application Number:	17119399
Application Number:	17140314
Application Number:	17140655
Application Number:	17208114
Application Number:	17246763
Application Number:	17340498
Application Number:	17353893
Application Number:	17454954
Application Number:	17462905
Application Number:	18055261
Application Number:	18057085
Application Number:	18251367
Application Number:	18251424

Property Type	Number
Application Number:	18902557
Application Number:	18909328
Application Number:	18930507
Application Number:	62858374
Application Number:	62945926
Application Number:	62963807
Application Number:	62976410
Application Number:	63012987
Application Number:	63022728
Application Number:	63042644
Application Number:	63072440
Application Number:	63112270
Application Number:	63114591

CORRESPONDENCE DATA

Fax Number: 6122841050

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: (612)677-9050
Email: docketing@stwiplaw.com,tracy.natysin@stwiplaw.com
Correspondent Name: Brandi Lazzari
Address Line 1: 100 South 5th St
Address Line 2: Ste 600
Address Line 4: Minneapolis, MINNESOTA 55402

ATTORNEY DOCKET NUMBER:	4001.0001101
NAME OF SUBMITTER:	BRANDI LAZZARI
SIGNATURE:	BRANDI LAZZARI
DATE SIGNED:	12/04/2024

Total Attachments: 54
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PATENT ASSIGNMENT

THIS PATENT ASSIGNMENT, dated as of November 8, 2024 (this "**Assignment**"), is made by and among Circulite, Inc., a Delaware corporation ("Circulite"), Heartware, Inc., a Delaware corporation ("Heartware"), Medtronic Vascular Galway Unlimited Company, a private unlimited company registered in Ireland ("MVG"), Medtronic, Inc., a Minnesota corporation ("Medtronic"), and World Heart Corporation, a Delaware corporation ("World Heart", and together with Circulite, Heartware, MVG and Medtronic, the "**Assignors**", and each an "**Assignor**"), and Boston Scientific Scimed, Inc., a Minnesota corporation ("**Assignee**").

WHEREAS, Assignors and Assignee are parties to that certain Asset Purchase Agreement, dated as of November 8, 2024 (the "**Purchase Agreement**"), among Assignors and Assignee, pursuant to which, among other things, Assignors have agreed to sell, convey, transfer, assign and deliver to Assignee, and Assignee has agreed to purchase from Assignors, all of the right, title, and interest in and to the Transferred Patents, as defined in the Purchase Agreement, which Patent Rights, as defined in the Purchase Agreement, are set forth on **Schedule A** attached hereto (collectively, the "**Assigned Patent Rights**"); and

WHEREAS, this Assignment is entered into pursuant to, and as a condition of the closing of the transactions contemplated under, the Purchase Agreement.

NOW, THEREFORE, for good and valuable consideration and pursuant to the terms of the Purchase Agreement, the Assignors and Assignee hereby agree as follows:

1. Each Assignor hereby sells, conveys, transfers, assigns and delivers to Assignee, and Assignee hereby accepts, purchases and assumes, all of such Assignor's right, title, and interest in and to the Assigned Patent Rights, together with all patents issuing on the Assigned Patent Rights, including those patents claiming priority thereto, and any provisionals, continuations, divisionals, continuations-in-part, substitutions, reissues, renewals, reexaminations, supplemental protection certificates, extensions, and registrations of or related to any such patents and the Assigned Patent Rights, and foreign counterparts of any of the foregoing, as each of the foregoing may exist anywhere in the world, and together with all rights to sue for past, present, and future infringement or misappropriation thereof, for any relief in law or in equity, and to recover any and all damages for such infringement or misappropriation in whatever form, including but not limited to lost profits or royalties (including the right to sue for pre-issuance royalties).

2. Each Assignor does hereby request and authorize the Commissioner of Patents and Trademarks of the United States and all other corresponding patent offices or authorities of other jurisdictions to issue letters patent, certificates of invention, utility models, or other governmental grants or issuances that may be granted upon any of the Assigned Patent Rights and the inventions disclosed in the Assigned Patent Rights to Assignee or Assignee's nominee, successor, or assign.

3. Each Assignor agrees to execute all specific assignments, oaths, declarations, deeds, or other instruments, and to do all acts necessary or proper, in each case, that are reasonably requested by Assignee: (a) to transfer to Assignee the Assigned Patent Rights and the inventions disclosed therein; and (b) to vest and confirm therein the legal title to all such patent rights.

4. Notwithstanding any other provisions of this Assignment to the contrary, nothing contained in this Assignment shall in any way supersede, modify, replace, amend, change, rescind, waive, exceed, expand, enlarge, or in any way affect the provisions, including warranties, covenants, agreements, conditions, representations, or in general any of the rights and remedies, or any of the obligations and indemnifications of each Assignor or Assignee set forth in the Purchase Agreement. This Assignment is intended only to effect the transfer of the Transferred Patents pursuant to the Purchase Agreement and shall be governed entirely in accordance with the terms and conditions of the Purchase Agreement.

5. This Assignment shall be binding on, and shall inure to the benefit of, each Assignor, Assignee, and their respective successors and/or assigns, and all others acting by, through, with, or under their direction, and all those in privity therewith.

6. This Assignment and any claims arising therefrom shall be governed by and construed in accordance with the laws of the State of Delaware, without giving effect to any choice or conflict of law provision or rule that would cause the application of laws of any jurisdiction other than those of the State of Delaware.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
MEDTRONIC, INC.

By: _____

Name: Holly Vitense

Title: Vice President & General Manager
Mechanical Circulatory Support

[Signature Page to Patent Assignment]

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
HEARTWARE, INC.

By: Holly Vitense
Name: Holly Vitense
Title: President

[Signature Page to Patent Assignment]

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
WORLD HEART CORPORATION

By: Holly Vitense

Name: Holly Vitense
Title: President

[Signature Page to Patent Assignment]

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
CIRCULITE, INC.

By: Holly Vitense
Name: Holly Vitense
Title: President

[Signature Page to Patent Assignment]

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
MEDTRONIC VASCULAR GALWAY UNLIMITED COMPANY

DocuSigned by:
By: Tom Shiel
F752DE8AB15D4A6...
Name: Thomas Gerard Shiel
Title: Director

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be executed by its duly authorized representatives effective this day of November 8, 2024.

ASSIGNOR:
CIRCULITE, INC.

By: _____
Name:
Title:

ASSIGNOR:
HEARTWARE, INC.

By: _____
Name:
Title:

ASSIGNOR:
MEDTRONIC VASCULAR GALWAY UNLIMITED COMPANY

By: _____
Name:
Title:

ASSIGNOR:
MEDTRONIC, INC.

By: _____
Name:
Title:

ASSIGNOR:
WORLD HEART CORPORATION

By: _____
Name:
Title:

ASSIGNEE: Boston Scientific Scimed, Inc.
[_____]

By: _____ *Electronically signed by: Daniel Brennan Reason: I am the Approver Date: Nov 8, 2024 07:58 EST*
Name:
Title: CFO

SCHEDULE A

ASSIGNED PATENT RIGHTS

	A	B	C	D	E	F	G	H	I	J	K
1	**For Schedule 1.1 "Transferred Patents"**										
2											
3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
4											
5	C00016099.CN01	PUMP HOMEOSTASIS INDICATOR (PHI)	China	Published		2018-07-03	201880046404.0				Veronica Ramos Neethu Lekshmi Vasudevan Jalaja Michael Brown
6	C00016907.USN3	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2006-06-02	11/992,997			8,790,236	Michael Brown Amy B. Cheng Veronica Ramos Alonso Trejo-Mora Neethu Lekshmi Vasudevan Jalaja
7	C00016907.USV4	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2011-08-17	13/212,014			8,668,473	Veronica Ramos Neethu Lekshmi Vasudevan Jalaja Michael Brown
8	C00016907.USV5	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2014-02-27	14/192,712			9,956,332	Veronica Ramos Neethu Lekshmi Vasudevan Jalaja Michael Brown
9	C00016907.USC6	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2014-07-10	14/327,971			9,339,598	Michael Brown Amy B. Cheng Veronica Ramos Alonso Trejo-Mora Neethu Lekshmi Vasudevan Jalaja
10	C00016907.USC7	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2016-05-10	15/151,058			9,737,652	DAnne Kudlik Robert Stadler
11	C00016907.USC26	AXIAL-FLOW PUMP WITH MULTI-GROOVED ROTOR	United States of America	Granted		2017-08-04	15/669,520			10,251,985	DAnne Kudlik Robert Stadler
12	C00016808.USC2	ROTARY PUMP WITH THRUST BEARINGS	United States of America	Granted		2011-08-04	13/198,313			8,540,477	DAnne Kudlik Robert Stadler
13	C00016807.USC15	HYDRODYNAMIC THRUST BEARINGS FOR ROTARY BLOOD PUMP	United States of America	Granted		2013-07-31	13/955,955			9,777,732	DAnne Kudlik Robert Stadler
14	C00016658.JPN5	Implanted Device with Wireless Energy Transfer and External Alignment Feature	Japan	Published		2015-09-17	2017514804				DAnne Kudlik Robert Stadler
15	C00016666.CNN8	FIDUCIAL POINT OPTIMIZATION	China	Granted		2015-11-24	201580074531.8			107614029	DAnne Kudlik Robert Stadler
16	C00016701.CNN4	Implantable Connector	China	Granted		2015-12-16	201580076307.2			107405436	DAnne Kudlik Robert Stadler
17	C00016707.USV9	Cardiac Pump Implantation Device and Method	United States of America	Lapsed Fee		2017-11-03	15/803,231			10,688,231	David Schafir Mustafa Ertan Taskin
18	C00016710.CNN7	Guidewire System and Method of Pump Installation Using Same	China	Granted		2015-12-15	201580076094.3			107580511	Troy Jackson
19	C00016754.CNN4	Blood Pump with Restart Lockout	China	Granted		2016-12-13	201680073096.1			108367107	Fernando Casas Mustafa Ertan Taskin David Schafir
20	C00016764CN01	Axial Flow Implantable Mechanical Circulatory Support Devices with Outlet Volute	China	Published		2016-12-20	201680074870.0				Mustafa Ertan Taskin Fernando Casas

	A	B	C	D	E	F	G	H	I	J	K
3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
21	C00016767CN01	PUMP MOTOR CONTROL WITH ADAPTIVE STARTUP	China	Granted		2016-12-28	201680076903.5			108,430,532	Fernando Casas Mustafa Ertan Taskin
22	C00016769CN01	VAD Controller Tester	China	Granted		2016-12-28	201680076658.8			108430531	Mustafa Ertan Taskin Fernando Casas
23	C00016797.USU2	Coring Tool	United States of America	Lapsed Fee		2013-08-23	13/974,920			10,117,663	David Schafir Fernando Casas
24	C00016819.JPV14	TET System for Implanted Medical Device	Japan	Granted		2015-05-07	2015095218			6104981	David Schafir Fernando Casas
25	C00016820.KRN11	HARD-WIRED IMPLANTED CONTROLLER SYSTEM	Korea	Granted		2010-09-21	1020127009884			101686888	David Schafir Fernando Casas
26	C00016822.USU2	Hydrodynamic Chamfer Thrust Bearing	United States of America	Granted		2011-06-17	13/163,253			8,894,387	Charles Shambaugh
27	C00016842.USU2	Blood Clot Filter with Local Thrombolytic Drug Delivery	United States of America	Lapsed Fee		2017-05-04	15/586,675			10,687,931	Christopher Michelena David Schafir Fernando Casas Mustafa Ertan Taskin
28	C00016845.USU2	Ventricular Assist Devices and Intergrated Sensors Thereof	United States of America	Lapsed Fee		2017-07-18	15/652,793			10,213,537	Christopher Michelena David Schafir Fernando Casas Mustafa Ertan Taskin
29	C00016847.USU2	VAD with Aortic Valve Opening Detection	United States of America	Lapsed Fee		2017-07-31	15/644,878			10,258,724	Christopher Michelena David Schafir Fernando Casas Mustafa Ertan Taskin
30	C00016847.CN01	VAD with Aortic Valve Opening Detection	China	Granted		2017-07-31	201780047934.2			109562221	Paul Esquenazi
31	C00016848.USU2	Heart Rate Determination Based on VAD Current Waveform	United States of America	Granted		2017-07-28	15/663,265			10,420,870	Katherine Chorpenning Carlos Reyes
32	C00016870.USU2	DEVICES FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	United States of America	Lapsed Fee		2011-02-11	13/025,757			8,768,487	Katherine Chorpenning Carlos Reyes
33	C00016871.EPN5	METHODS FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	European Patent	Granted		2011-02-07	08835271.1			2170431	Katherine Chorpenning Carlos Reyes
34	C00016873.EPN6	Intravascular Blood Pump And Catheter	European Patent	Granted		2009-03-02	07842515.4			2061531	Katherine Chorpenning Carlos Reyes
35	C00016874.EPV15	CANNULA FOR HEART CHAMBER IMPLANTATION AND RELATED SYSTEMS AND METHODS	European Patent	Granted		2008-06-10	13151152.9			2581106	Stefan Kracker
36	C00016875.EPN4	CANNULA INSERTION DEVICES, SYSTEMS, AND METHODS INCLUDING A COMPRESSIBLE MEMBER	European Patent	Granted		2008-08-01	20080828615			2152339	Eric Schilling Brian Kuhnley Erin Hatlestad Stephen Nelson Nathanael O Mason
37	C00016889.USU2	CANNULA TIPS, TISSUE ATTACHMENT RINGS, AND METHODS OF DELIVERING AND USING THE SAME	United States of America	Granted		2012-09-04	13/602,747			8,821,527	Eric Schilling Brian Kuhnley Erin Hatlestad Stephen Nelson Nathanael O Mason

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
38	C00016889.EPN7	CANNULA TIPS, TISSUE ATTACHMENT RINGS, AND METHODS OF DELIVERING AND USING THE SAME	European Patent	Granted		2012-09-06	12829223.2			2753389	Eric Schilling Brian Kuhnley Erin Hatlestad Stephen Nelson Nathanael O Mason
39	C00016891.USU1	MALLEABLE CANNULA	United States of America	Granted		2013-03-07	13/788,039			10,688,230	Eric Schilling Brian Kuhnley Erin Hatlestad Stephen Nelson Nathanael O Mason
40	C00016901.CNN3	INFLOW CANNULA AND BLOOD FLOW ASSIST SYSTEM	China	Granted		2015-11-06	201580084286.9			108348666	Michael Kemmerer Robert Ecker
41	C00016910.USU2	Anchored Mounting Ring	United States of America	Granted		2014-10-21	14/519,850			10,279,092	Thomas Fick Michael Eggen Jeffrey Swanson David Engmark Lisa Dalluge
42	C00016913.USC5	Apparatus and Methods for Cutting an Atrial Wall	United States of America	Lapsed Fee		2017-10-10	15/728,857			10,660,669	Thomas Fick Michael Eggen Jeffrey Swanson David Engmark Lisa Dalluge
43	C00016926.CN01	Single-Piece Volute	China	Granted		2017-10-27	201780065651.0			109862925	Thomas Fick Michael Eggen Jeffrey Swanson David Engmark Lisa Dalluge
44	C00016926.USU2	Single-Piece Volute	United States of America	Lapsed Fee		2017-10-27	15/795,436			10,549,019	Thomas Fick Michael Eggen Jeffrey Swanson David Engmark Lisa Dalluge
45	C00017193.CN01	Dry Disconnect/Bubble Free Coupling for Blood Transfer	China	Granted		2018-10-02	201880054302.3			110997056	Eric Schilling David Peichel Jonathan P Roberts Joel Artmann Michael Reinert
46	C00017195EP01	Intermediate Power Supply with Sensing and Communication System	European Patent	Published		2018-10-05	18792806.4				Eric Schilling David Peichel Jonathan P Roberts Joel Artmann Michael Reinert
47	C00017202CN01	VAD WITH INTRA-HOUSING FLUID ACCESS PORTS	China	Granted		2018-10-26	201880070701.9			111295210	Eric Schilling David Peichel Jonathan P Roberts Joel Artmann Michael Reinert

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
48	C00017842.CN01	DYNAMIC HQ FOR CLOSED LOOP CONTROL	China	Granted		2018-10-01	201880066311.4			111201049	Eric Schilling Brian Kuhnley
49	A0002116US02	Method for including redundancy in communicating an alert condition from an implanted system to an external system	United States of America	Granted	2020-02-14	2021-01-04	17/140,314	2022-12-06	2041-01-04	11,521,739	Eric Schilling Brian Kuhnley
50	A0002116WO01	Method for including redundancy in communicating an alert condition from an implanted system to an external system	Patent Cooperation Treaty	Converted	2020-02-14	2021-01-11	PCT/US2021/012877		2022-10-14		Eric Schilling Brian Kuhnley
51	A0002124US02	CARRYING CASE FOR CONTROLLER OF PATIENTS WITH VADS	United States of America	Published	2020-06-23	2021-06-07	17/340,498				Luka Grujic Lance Farb Gerald Herman Nicholas S Difranco Joseph Ippolito Tim Hillukka
52	A0002249US04	RECTIFIER AND THE TIMING OF SWITCHING OF CAPACITORS	United States of America	Published	2020-08-31	2021-08-31	17/462,905				Jonathan P Roberts Joel Artmann David Peichel Jacob Roe Michael Kemmerer
53	A0002265CN01	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	China	Published	2019-11-22	2020-11-16	202080080795.5				Carlos Reyes Neethu Lekshmi Vasudevan Jalaja
54	A0002265DE01	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	Germany (Federal Republic of)	Granted	2019-11-22	2020-11-16	20824373.3	2023-11-01	2040-11-16	60 2020 020 442.3	Carlos Reyes Neethu Lekshmi Vasudevan Jalaja
55	A0002265EP01	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	European Patent	Converted	2019-11-22	2020-11-16	20824373.3	2023-11-01	2040-11-16	4061470	Carlos Reyes Neethu Lekshmi Vasudevan Jalaja
56	A0002265US02	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	United States of America	Granted	2019-11-22	2020-11-11	17/095,096	2023-07-25	2041-10-09	11,707,617	Carlos Reyes Neethu Lekshmi Vasudevan Jalaja
57	A0002265US03CON	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	United States of America	Published	2019-11-22	2023-06-08	18/331,364				Carlos Reyes Neethu Lekshmi Vasudevan Jalaja
58	A0002265WO01	METHOD TO EXTRACT AND QUANTIFY THE CARDIAC END DIASTOLIC POINT/MITRAL VALVE CLOSING POINT FROM THE HVAD ESTIMATED FLOW WAVEFORM	Patent Cooperation Treaty	Converted	2019-11-22	2020-11-16	PCT/US2020/060661		2022-07-22		Carlos Reyes Neethu Lekshmi Vasudevan Jalaja

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
59	A0002408US04	LOCKING FEATURE FOR LVAD CONNECTOR	United States of America	Published	2020-11-17	2021-09-28	18/251,424				Kevin Seifert Jonathan Hughes Lisa Dalluge Andrew Ries Thomas Fick Richard Nelson
60	A0002408WO02	LOCKING FEATURE FOR LVAD CONNECTOR	Patent Cooperation Treaty	Converted	2020-11-17	2021-09-28	PCT/US2021/052267		2023-07-17		Kevin Seifert Jonathan Hughes Lisa Dalluge Andrew Ries Thomas Fick Richard Nelson
61	A0002409CN01	Implantable LVAD Pump Controller Header	China	Granted	2020-04-27	2020-08-07	202030446187.4	2021-03-09	2030-08-06	ZL202030446187.4	Lisa Dalluge Andrew Ries Thomas Fick Kevin Seifert Richard Nelson Jonathan Hughes
62	A0002409EM01	Implantable LVAD Pump Controller Header	European Union	Granted	2020-04-27	2020-10-27	008214126-0001	2020-10-27	2045-10-27	008214126-0001	Lisa Dalluge Andrew Ries Thomas Fick Kevin Seifert Richard Nelson Jonathan Hughes
63	A0002409GB01	Implantable LVAD Pump Controller Header	United Kingdom	Granted	2020-04-27	2020-10-27	90082141260001	2020-10-27	2045-10-27	90082141260001	Lisa Dalluge Andrew Ries Thomas Fick Kevin Seifert Richard Nelson Jonathan Hughes
64	A0002409US01	Implantable LVAD Pump Controller Header	United States of America	Application		2020-04-27	29/732,689				Lisa Dalluge Andrew Ries Thomas Fick Kevin Seifert Richard Nelson Jonathan Hughes
65	A0002419DE01	Diagnostic Metric for Cumulative Presence of Suction Conditions	Germany (Federal Republic of)	Application	2020-01-21	2020-12-23	11 2020 006 567.7				DAnne Kudlik
66	A0002419US02	Diagnostic Metric for Cumulative Presence of Suction Conditions	United States of America	Granted	2020-01-21	2020-12-11	17/119,399	2023-04-04	2041-04-19	11,617,878	DAnne Kudlik
67	A0002419WO01	Diagnostic Metric for Cumulative Presence of Suction Conditions	Patent Cooperation Treaty	Converted	2020-01-21	2020-12-23	PCT/US2020/066773		2022-09-21		DAnne Kudlik
68	A0002456US02	Method for determining coupling coefficient for wireless power transfer	United States of America	Published	2019-12-10	2020-11-13	17/097,375				David Peichel Can Cinbis Jonathan P Roberts
69	A0002492DE01	NOTIFICATION SYSTEM FOR LOW-LEVEL PREVENTATIVE LVAD ALERTS	Germany (Federal Republic of)	Published	2020-06-16	2021-05-27	11 2021 003 292.5				DAnne Kudlik Joseph Ippolito

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
70	A0002492US02	NOTIFICATION SYSTEM FOR LOW-LEVEL PREVENTATIVE LVAD ALERTS	United States of America	Granted	2020-06-16	2021-03-04	17/192,028	2023-07-04	2041-03-04	11,694,539	DAnne Kudlik Joseph Ippolito
71	A0002492WO01	NOTIFICATION SYSTEM FOR LOW-LEVEL PREVENTATIVE LVAD ALERTS	Patent Cooperation Treaty	Converted	2020-06-16	2021-05-27	PCT/US2021/034395		2023-02-16		DAnne Kudlik Joseph Ippolito
72	A0002811DE01	ALGORITHM FOR DETECTING AND PRESENTING SUCTION IN DOWN-SAMPLED MCS LOG FILES	Germany (Federal Republic of)	Published	2020-04-16	2021-03-30	11 2021 002 410.8				Michael Brown Veronica Ramos Neil Voskoboynikov
73	A0002811US02	ALGORITHM FOR DETECTING AND PRESENTING SUCTION IN DOWN-SAMPLED MCS LOG FILES	United States of America	Published	2020-04-16	2021-03-05	17/193,548				Michael Brown Veronica Ramos Neil Voskoboynikov
74	A0002811WO01	ALGORITHM FOR DETECTING AND PRESENTING SUCTION IN DOWN-SAMPLED MCS LOG FILES	Patent Cooperation Treaty	Converted	2020-04-16	2021-03-30	PCT/US2021/024821		2022-12-16		Michael Brown Veronica Ramos Neil Voskoboynikov
75	A0002866DE01	Cost Function for Response Algorithm	Germany (Federal Republic of)	Application	2020-02-20	2021-02-01	11 2021 001 148.0				DAnne Kudlik
76	A0002866US01	COST FUNCTION FOR RESPONSE ALGORITHM	United States of America	Granted		2020-02-20	16/796,017	2022-11-22	2041-01-22	11,504,520	DAnne Kudlik
77	A0002866US02CON	COST FUNCTION FOR RESPONSE ALGORITHM	United States of America	Published	2020-02-20	2022-11-18	18/057,085				DAnne Kudlik
78	A0002866WO01	Cost Function for Response Algorithm	Patent Cooperation Treaty	Converted	2020-02-20	2021-02-01	PCT/US2021/016000		2022-10-20		DAnne Kudlik
79	A0003275DE01	METHOD OF DETECTING PRESENCE OF IMPLANTED POWER TRANSFER COIL	Germany (Federal Republic of)	Application	2020-04-07	2021-03-01	11 2021 002 181.8				David Peichel Jonathan P Roberts Jacob Roe
80	A0003275US01	Method of detecting presence of implanted power transfer coil	United States of America	Granted		2020-04-07	16/841,904	2021-07-13	2040-04-07	11,063,479	David Peichel Jonathan P Roberts Jacob Roe
81	A0003275US02CON	Method of detecting presence of implanted power transfer coil	United States of America	Granted	2020-04-07	2021-06-22	17/353,893	2023-05-30	2040-04-07	11,660,458	David Peichel Jonathan P Roberts Jacob Roe
82	A0003275WO01	METHOD OF DETECTING PRESENCE OF IMPLANTED POWER TRANSFER COIL	Patent Cooperation Treaty	Converted	2020-04-07	2021-03-01	PCT/US2021/020179		2022-12-07		David Peichel Jonathan P Roberts Jacob Roe
83	A0003279US01	TEMPERATURE SENSING OF IMPLANTED WIRELESS RECHARGE COIL	United States of America	Published		2021-01-04	17/140,655				David Peichel Pankti N Shah Joel Artmann Jonathan P Roberts
84	A0003334US02	EXTERNAL WIRELESS POWER TRANSFER COIL	United States of America	Published	2020-05-11	2021-05-03	17/246,763				David Peichel Ramesh Raghupathy
85	A0003427DE01	ALGORITHM FOR UTILIZING MULTIPLE INPUTS TO MODULATE THE CHARGING RATE OF A FULLY IMPLANTABLE SYSTEM	Germany (Federal Republic of)	Published	2020-05-13	2021-01-04	11 2021 002 743.3				Eric Schilling Erin Hatlestad Thomas Radtke Brian Kuhnley David Siegfried
86	A0003427US01	ALGORITHM FOR UTILIZING MULTIPLE INPUTS TO MODULATE THE CHARGING RATE OF A FULLY IMPLANTABLE SYSTEM	United States of America	Granted		2020-05-13	15/930,491	2022-11-15	2040-10-23	11,497,905	Eric Schilling Erin Hatlestad Thomas Radtke Brian Kuhnley David Siegfried

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
87	A0003427US02CON	UTILIZING MULTIPLE INPUTS TO MODULATE THE CHARGING RATE OF A FULLY IMPLANTABLE SYSTEM	United States of America	Published	2020-05-13	2022-11-14	18/055,261				Eric Schilling Erin Hatlestad Thomas Radtke Brian Kuhnley David Siegfried
88	A0003427WO01	ALGORITHM FOR UTILIZING MULTIPLE INPUTS TO MODULATE THE CHARGING RATE OF A FULLY IMPLANTABLE SYSTEM	Patent Cooperation Treaty	Converted	2020-05-13	2021-01-04	PCT/US2021/012046		2023-01-13		Eric Schilling Erin Hatlestad Thomas Radtke Brian Kuhnley David Siegfried
89	A0003494DE01	DETECTING HEATING OF IMPLANTED COIL HERMETIC PACKAGE WHEN MISALIGNED	Germany (Federal Republic of)	Published	2020-11-11	2021-09-22	11 2021 005 917.3				Danielle Rasmussen Eric Schilling David Peichel
90	A0003494US02	DETECTING HEATING OF IMPLANTED COIL HERMETIC PACKAGE WHEN MISALIGNED	United States of America	Published	2020-11-11	2021-09-22	18/251,367				Danielle Rasmussen Eric Schilling David Peichel
91	A0003494WO01	DETECTING HEATING OF IMPLANTED COIL HERMETIC PACKAGE WHEN MISALIGNED	Patent Cooperation Treaty	Converted	2020-11-11	2021-09-22	PCT/US2021/051442		2023-07-11		Danielle Rasmussen Eric Schilling David Peichel
92	A0003570US02	TRHOMBUS DIVERTER CONCEPT	United States of America	Granted	2020-03-17	2021-01-08	17/144,290	2023-05-16	2041-05-16	11,648,393	Mustafa Ertan Taskin Charles Shambaugh
93	A0003742DE01	DIGITALLY TIMED CMOS RECTIFIER FOR WIRELESS POWER TRANSFER	Germany (Federal Republic of)	Published	2020-11-03	2021-09-22	11 2021 005 809.6				Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
94	A0003742US01	DIGITALLY TIMED CMOS RECTIFIER FOR WIRELESS POWER TRANSFER	United States of America	Granted		2020-11-03	17/087,685	2022-02-01	2040-11-03	11,239,698	Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
95	A0003742WO01	DIGITALLY TIMED CMOS RECTIFIER FOR WIRELESS POWER TRANSFER	Patent Cooperation Treaty	Converted	2020-11-03	2021-09-22	PCT/US2021/051437		2023-07-03		Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
96	A0003743DE01	POWER SOURCE SELECTION FOR A FULLY IMPLANTABLE LVAD SYSTEM	Germany (Federal Republic of)	Published	2020-07-31	2021-07-15	11 2021 004 122.3				Eric Schilling Jacob Roe Joel Artmann Jason Lee Jonathan P Roberts David Peichel
97	A0003743US01	POWER SOURCE SELECTION FOR A FULLY IMPLANTABLE LVAD SYSTEM	United States of America	Granted		2020-07-31	16/944,564	2022-09-27	2040-08-05	11,452,860	Eric Schilling Jacob Roe Joel Artmann Jason Lee Jonathan P Roberts David Peichel

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
98	A0003743WO01	POWER SOURCE SELECTION FOR A FULLY IMPLANTABLE LVAD SYSTEM	Patent Cooperation Treaty	Converted	2020-07-31	2021-07-15	PCT/US2021/041745		2023-03-31		Eric Schilling David Peichel Joel Artmann Jason Lee Jonathan P Roberts Jacob Roe
99	A0003892DE01	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Germany (Federal Republic of)	Published	2020-11-02	2021-09-21	11 2021 005 771.5				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
100	A0003892US04	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	United States of America	Published	2020-11-02	2021-09-21	18/251,328				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
101	A0003892WO01	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Patent Cooperation Treaty	Converted	2020-11-02	2021-09-21	PCT/US2021/051200		2023-07-02		Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
102	A0003894US01	CONNECTOR CONDITIONING/BORE PLUG	United States of America	Granted		2021-07-16	17/378,003	2023-11-14	2041-08-13	11,813,468	Kevin Seifert Lonnie D Ronning Michael Eggen Michelle Reinert

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
103	A0003956DE01	METHOD FOR PUMP START IN A FULLY IMPLANTED LVAD SYSTEM WHEN MULTIPLE POWER SOURCES MAY BE PRESENT	Germany (Federal Republic of)	Published	2020-09-01	2021-08-10	11 2021 004 597.0				Eric Schilling Joel Artmann Jason Lee David Siegfried
104	A0003956US01	METHOD FOR PUMP START IN A FULLY IMPLANTED LVAD SYSTEM WHEN MULTIPLE POWER SOURCES MAY BE PRESENT	United States of America	Published		2020-09-01	17/009,224				Eric Schilling Joel Artmann Jason Lee David Siegfried
105	A0003956WO01	METHOD FOR PUMP START IN A FULLY IMPLANTED LVAD SYSTEM WHEN MULTIPLE POWER SOURCES MAY BE PRESENT	Patent Cooperation Treaty	Converted	2020-09-01	2021-08-10	PCT/US2021/045295		2023-05-01		Eric Schilling Joel Artmann Jason Lee David Siegfried
106	A0003957CN01	MANAGING PUMP SPEED WHEN POWER CONSTRAINED IN A FULLY IMPLANTED LVAD SYSTEM	China	Published	2020-07-31	2021-07-13	202180058792.6				Eric Schilling Joel Artmann Jason Lee David Siegfried
107	A0003957EP01	MANAGING PUMP SPEED WHEN POWER CONSTRAINED IN A FULLY IMPLANTED LVAD SYSTEM	European Patent	Published	2020-07-31	2021-07-13	21752314.1				Eric Schilling Joel Artmann Jason Lee David Siegfried
108	A0003957US02	MANAGING PUMP SPEED WHEN POWER CONSTRAINED IN A FULLY IMPLANTED LVAD SYSTEM	United States of America	Published	2020-07-31	2021-06-30	17/363,065				Eric Schilling Joel Artmann Jason Lee David Siegfried
109	A0003957WO01	MANAGING PUMP SPEED WHEN POWER CONSTRAINED IN A FULLY IMPLANTED LVAD SYSTEM	Patent Cooperation Treaty	Converted	2020-07-31	2021-07-13	PCT/US2021/041348		2023-03-31		Eric Schilling Joel Artmann Jason Lee David Siegfried
110	A0003958US01	MANAGING THE ELECTRIC FIELD EXPOSURE IN A FULLY IMPLANTED LVAD SYSTEM	United States of America	Granted		2020-08-25	17/001,969	2023-05-09	2041-07-22	11,642,512	Eric Schilling David Peichel Jason Lee David Siegfried
111	A0003959DE01	AUTOMATED AND SEMI-AUTOMATED DESIGNS FOR BATTERY CONDITIONING IN A FULLY IMPLANTED LVAD	Germany (Federal Republic of)	Published	2020-12-08	2021-12-07	11 2021 006 358.8				Eric Schilling Joel Artmann Bo Zhang Stephen Nelson David Siegfried
112	A0003959US01	AUTOMATED AND SEMI-AUTOMATED DESIGNS FOR BATTERY CONDITIONING IN A FULLY IMPLANTED LVAD	United States of America	Published		2020-12-08	17/114,720				Joel Artmann Bo Zhang Eric Schilling David Siegfried Stephen Nelson
113	A0003959WO01	AUTOMATED AND SEMI-AUTOMATED DESIGNS FOR BATTERY CONDITIONING IN A FULLY IMPLANTED LVAD	Patent Cooperation Treaty	Converted	2020-12-08	2021-12-07	PCT/US2021/062104		2023-08-08		Eric Schilling Joel Artmann Bo Zhang Stephen Nelson David Siegfried

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
114	A0003960DE01	METHOD OF PRIORITIZING COMMUNICATION CONNECTIONS FOR A FULLY IMPLANTED LVAD SYSTEM	Germany (Federal Republic of)	Published	2020-09-01	2021-08-10	11 2021 004 582.2				Eric Schilling Bo Zhang Thomas August Joel Artmann Christopher House
115	A0003960US01	METHOD OF PRIORITIZING COMMUNICATION CONNECTIONS FOR A FULLY IMPLANTED LVAD SYSTEM	United States of America	Published		2020-09-01	17/008,824				Eric Schilling Christopher House Bo Zhang Thomas August Joel Artmann
116	A0003960WO01	METHOD OF PRIORITIZING COMMUNICATION CONNECTIONS FOR A FULLY IMPLANTED LVAD SYSTEM	Patent Cooperation Treaty	Converted	2020-09-01	2021-08-10	PCT/US2021/045296		2023-05-01		Eric Schilling Bo Zhang Thomas August Joel Artmann Christopher House
117	A0004149US01	COIL SHUNTING FOR VOLTAGE LIMITING OF INDUCTIVELY TRANSFERRED POWER	United States of America	Published		2020-09-15	17/021,180				Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
118	A0004163US01	HEADER/CONNECTOR THERMAL SPREADER	United States of America	Published		2021-07-16	17/378,051				Kevin Seifert Lisa Dalluge Ramesh Raghupathy
119	A0004193DE01	METHOD FOR POWER MONITORING AND DYNAMICALLY MANAGING POWER IN A FULLY IMPLANTED LVAD SYSTEM	Germany (Federal Republic of)	Published	2020-12-22	2021-12-07	11 2021 006 596.3				Joel Artmann Jacob Roe Jonathan P Roberts David Peichel
120	A0004193US01	METHOD FOR POWER MONITORING AND DYNAMICALLY MANAGING POWER IN A FULLY IMPLANTED LVAD SYSTEM	United States of America	Granted		2020-12-22	17/130,197			12,023,480	Joel Artmann Jacob Roe Jonathan P Roberts David Peichel
121	A0004193WO01	METHOD FOR POWER MONITORING AND DYNAMICALLY MANAGING POWER IN A FULLY IMPLANTED LVAD SYSTEM	Patent Cooperation Treaty	Converted	2020-12-22	2021-12-07	PCT/US2021/062107		2023-08-22		Joel Artmann Jacob Roe Jonathan P Roberts David Peichel
122	A0004221DE01	METHOD FOR ADJUSTING THE RATE OF "SEARCHING PULSES" IN A TETS SYSTEM	Germany (Federal Republic of)	Published	2020-11-02	2021-09-21	11 2021 005 778.2				Jonathan P Roberts David Peichel Eric Schilling Stephen Nelson
123	A0004221US01	METHOD FOR ADJUSTING THE RATE OF "SEARCHING PULSES" IN A TETS SYSTEM	United States of America	Granted		2020-11-02	17/086,825			11,998,731	Jonathan P Roberts David Peichel Eric Schilling Stephen Nelson
124	A0004221WO01	METHOD FOR ADJUSTING THE RATE OF "SEARCHING PULSES" IN A TETS SYSTEM	Patent Cooperation Treaty	Converted	2020-11-02	2021-09-21	PCT/US2021/051208		2023-07-02		Jonathan P Roberts David Peichel Eric Schilling Stephen Nelson

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
125	A0004365US01	MULTI-DUROMETER ATTACHMENT DEVICE FOR CHRONIC FIXATION	United States of America	Published		2020-11-24	17/102,807				Jason Hamack Pankti N Shah Scott Tuominen
126	A0004427US01	SLEEP MODE AND DO-NOT-DISTURB MODE FOR A LEFT VENTRICULAR ASSIST DEVICE	United States of America	Granted		2021-01-05	17/141,558	2023-10-17	2041-12-18	11,786,721	DAnne Kudlik Robert Stadler
127	A0004460CN01	METHOD FOR REGULATING TETS POWER TRANSFER	China	Published	2021-02-12	2022-02-02	202280014387.9				Jonathan P Roberts David Peichel Joel Artmann Jacob Roe
128	A0004460EP01	METHOD FOR REGULATING TETS POWER TRANSFER	European Patent	Published	2021-02-12	2022-02-02	22753140.7				Jonathan P Roberts David Peichel Joel Artmann Jacob Roe
129	A0004460US01	METHOD FOR REGULATING TETS POWER TRANSFER	United States of America	Granted		2021-02-12	17/174,717			12,005249	Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
130	A0004460WO01	METHOD FOR REGULATING TETS POWER TRANSFER	Patent Cooperation Treaty	Converted	2021-02-12	2022-02-02	PCT/US2022/014818		2023-10-12		Jacob Roe Joel Artmann Jonathan P Roberts David Peichel
131	A0004777DE01	PROCESSES FOR VAD CONTROLLER EXCHANGE AND FIRMWARE UPGRADE WITH UNINTERRUPTED CIRCULATORY SUPPORT	Germany (Federal Republic of)	Published	2020-10-29	2021-09-17	11 2021 005 711.1				Mark Egler
132	A0004777US02	PROCESSES FOR VAD CONTROLLER EXCHANGE AND FIRMWARE UPGRADE WITH UNINTERRUPTED CIRCULATORY SUPPORT	United States of America	Published	2020-10-29	2021-09-17	18/250,649				Mark Egler
133	A0004777WO01	PROCESSES FOR VAD CONTROLLER EXCHANGE AND FIRMWARE UPGRADE WITH UNINTERRUPTED CIRCULATORY SUPPORT	Patent Cooperation Treaty	Converted	2020-10-29	2021-09-17	PCT/US2021/050821		2023-06-29		Mark Egler
134	A0004954DE01	DETECTION OF ABNORMAL CHANGES IN FLOW PULSATILITY CLINICALLY CORRELATED WITH ADVERSE EVENTS USING LOGFILE DATA	Germany (Federal Republic of)	Published	2020-11-13	2021-09-22	11 2021 005 946.7				Neethu Lekshmi Vasudevan Jalaja
135	A0004954US01	DETECTION OF ABNORMAL CHANGES IN FLOW PULSATILITY CLINICALLY CORRELATED WITH ADVERSE EVENTS USING LOGFILE DATA	United States of America	Published		2020-11-13	17/097,169				Neethu Lekshmi Vasudevan Jalaja
136	A0004954WO01	DETECTION OF ABNORMAL CHANGES IN FLOW PULSATILITY CLINICALLY CORRELATED WITH ADVERSE EVENTS USING LOGFILE DATA	Patent Cooperation Treaty	Converted	2020-11-13	2021-09-22	PCT/US2021/051446		2023-07-13		Neethu Lekshmi Vasudevan Jalaja
137	A0005200CA01	Method and apparatus for determining aortic valve opening	Canada	Granted	2014-09-23	2015-09-22	2,961,963	2023-01-31	2035-09-22	2,961,963	Marcus Granegger Francesco Moscato Heinrich Schima Christopher Simon Hayward
138	A0005200DE01	Method and apparatus for determining aortic valve opening	Germany (Federal Republic of)	Granted	2014-09-23	2015-09-22	15845296.1	2019-10-23	2035-09-22	60 2015 040 481.5	Marcus Granegger Francesco Moscato Heinrich Schima Christopher Simon Hayward

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
139	A0005200EP01	Method and apparatus for determining aortic valve opening	European Patent	Converted	2014-09-23	2015-09-22	15845296.1	2019-10-23	2035-09-22	3197517	Marcus Granegger Francesco Moscato Heinrich Schima Christopher Simon Hayward
140	A0005200US01	Method and apparatus for determining aortic valve opening	United States of America	Granted	2014-09-23	2015-09-22	15/513,519	2020-06-30	2036-11-24	10,695,474	Marcus Granegger Francesco Moscato Heinrich Schima Christopher Simon Hayward
141	A0005207AU02	Ventricular Assist Device Method and Apparatus	Australia	Granted	2014-05-29	2015-05-28	2015268105	2019-12-12	2035-05-28	2015268105	Christopher Simon Hayward
142	A0005207EP01	Ventricular Assist Device Method and Apparatus	European Patent	Converted	2014-05-29	2015-05-28	15799117.5	2020-09-30	2035-05-28	3148604	Christopher Simon Hayward
143	A0005207FR01	Ventricular Assist Device Method and Apparatus	France	Granted	2014-05-29	2015-05-28	15799117.5	2020-09-30	2035-05-28	3148604	Christopher Simon Hayward
144	A0005207US01	Ventricular Assist Device Method and Apparatus	United States of America	Granted	2014-05-29	2015-05-28	15/314,088	2020-04-07	2035-07-20	10,610,627	Christopher Simon Hayward
145	A0005207WO01	Ventricular Assist Device Method and Apparatus	Patent Cooperation Treaty	Converted	2014-05-29	2015-05-28	PCT/AU2015/050288		2017-01-29		Christopher Simon Hayward
146	A0005508US02	ACCOUNT FOR PRELOAD CHANGES IN THE LEFT VENTRICLE	United States of America	Application	2021-02-02	2022-02-01	18/263,771				Neethu Lekshmi Vasudevan Jalaja Carlos Reyes
147	A0005508WO01	PRELOAD RATIO: NORMALIZED RATIO TO ACCOUNT FOR PRELOAD CHANGES IN THE LEFT VENTRICLE	Patent Cooperation Treaty	Converted	2021-02-02	2022-02-01	PCT/US2022/014645		2023-10-02		Neethu Lekshmi Vasudevan Jalaja Carlos Reyes
148	A0005632US02	A METHOD TO IDENTIFY LVAD PATIENTS WITH ELEVATED LEVELS OF BLOOD ACTIVATION USING COUPON TESTS	United States of America	Application	2021-02-01	2022-02-01	18/260,914				Narendra Simha Sinduja Thinamany James Dawson
149	A0005632WO01	A METHOD TO IDENTIFY LVAD PATIENTS WITH ELEVATED LEVELS OF BLOOD ACTIVATION USING COUPON TESTS	Patent Cooperation Treaty	Converted	2021-02-01	2022-02-01	PCT/US2022/014644		2023-10-01		Narendra Simha Sinduja Thinamany James Dawson
150	A0005836DE01	ATTACHMENT MECHANISM FOR ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Germany (Federal Republic of)	Published	2020-11-02	2021-09-17	11 2021 005 772.3				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
151	A0005836US02	ATTACHMENT MECHANISM FOR ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	United States of America	Published	2020-11-02	2021-09-17	18/251,342				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
152	A0005836WO01	ATTACHMENT MECHANISM FOR ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Patent Cooperation Treaty	Converted	2020-11-02	2021-09-17	PCT/US2021/050829		2023-07-02		Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
153	A0005838DE01	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Germany (Federal Republic of)	Published	2020-11-02	2021-09-17	11 2021 005 794.4				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
154	A0005838US02	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	United States of America	Published	2020-11-02	2021-09-17	18/251,359				Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
155	A0005838WO01	ALIGNMENT GARMENT FOR USE WITH A FULLY IMPLANTABLE SYSTEM	Patent Cooperation Treaty	Converted	2020-11-02	2021-09-17	PCT/US2021/050824		2023-07-02		Stephen Nelson David Peichel Eric Schilling Nathanael O Mason Robert Scadding Moir Lilian E. Clarke Ismail Akram Glenn Le Faou Richard James Andrews Jordi Vilanova Hanusaik Anna Rebecca Louise Wilson Arron Carmo do Rosario Rodrigues
156	A0005853DE01	STROKE DETECTION AND STROKE RISK MANAGEMENT IN MECHANICAL CIRCULATORY SUPPORT DEVICE PATIENTS	Germany (Federal Republic of)	Application	2021-05-18	2022-04-27	11 2022 002 624.3				DAnne Kudlik Anne Dierlam
157	A0005853WO01	STROKE DETECTION AND STROKE RISK MANAGEMENT IN MECHANICAL CIRCULATORY SUPPORT DEVICE PATIENTS	Patent Cooperation Treaty	Converted	2021-05-18	2022-04-27	PCT/US2022/026428		2024-01-18		DAnne Kudlik Anne Dierlam
158	A0006023DE02	HVAD ADVERSE EVENT DETECTION FROM CARDIAC COMPASS DATA	Germany (Federal Republic of)	To Be Filed	2021-08-17	2022-08-17					Abhijit Kadrolkar Troy Jackson
159	A0006023US02	HVAD ADVERSE EVENT DETECTION FROM CARDIAC COMPASS DATA	United States of America	Published	2021-08-17	2022-08-16	17/820,132				Abhijit Kadrolkar Troy Jackson
160	A0006023WO01	HVAD ADVERSE EVENT DETECTION FROM CARDIAC COMPASS DATA	Patent Cooperation Treaty	Published	2021-08-17	2022-08-17	PCT/US2022/075063		2024-04-17		Abhijit Kadrolkar Troy Jackson
161	A0006868DE01	MECHANICAL CIRCULATORY SUPPORT DEVICE	Germany (Federal Republic of)	Application	2021-11-15	2022-11-15	10 2022 130 174.5				Mustafa Ertan Taskin Fernando Casas
162	A0006868US01	MECHANICAL CIRCULATORY SUPPORT DEVICE	United States of America	Published		2021-11-15	17/454,954				Mustafa Ertan Taskin Fernando Casas
163	A0007760US02	MEDICAL DEVICE SYSTEM FOR CLASSIFICATION AND PREDICTION OF MEDICAL EVENTS USING TIME-BETWEEN-EVENT VALUES	United States of America	Application	2022-08-05	2023-07-31	18/362,382				John Dubuc
164	A0012116US01	Algorithm to flag risk of Pump Start Failure	United States of America	To Be Filed							

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
165	C00005324.USU2	Modular Implantable Ventricular Assist Device	United States of America	Granted	2014-03-05	2015-03-03	14/636,259	2017-04-11	2035-03-26	9,616,159	Marc Anderson Declan Costello Niall Duffy Paul Devereux John Gallagher Marian Patricia Lally John Milroy
166	C00015905.EPN3	LOW PROFILE INLET FOR AN IMPLANTABLE BLOOD PUMP	European Patent	Converted	2002-06-13	2003-05-29	03731429.1	2013-05-01	2023-05-29	1534358	James Antaki Jed C. C Ludlow Scott D Miles
167	C00015906.EP01	Implantable Centrifugal Blood Pump with Hybrid Magnetic Bearings	European Patent	Converted	1999-04-22	1999-04-22	99921446.3	2012-12-26	2019-04-22	1073844	Paul E Allaire Gill Bearnson Ron Flack Don B Olsen James W. Long Ajit B Kumar Michael J Baloh
168	C00015907.EPN6	ELECTROMAGNETIC DRIVE FOR A VENTRICULAR ASSIST DEVICE	European Patent	Converted	2005-06-09	2006-06-09	06772785.9	2018-10-24	2026-06-09	1888142	Jal S Jassawalla David H LaForge Phillip J Miller
169	C00015907.EPN7	Single Sac Ventricular Assist Device	European Patent	Converted	2005-06-09	2006-06-09	06784737.6	2016-03-30	2026-06-09	1888166	Jal S Jassawalla David H LaForge Phillip J Miller
170	C00015909.EPN4	SMOOTH VENTRICULAR ASSIST DEVICE CONDUIT	European Patent	Converted	1998-11-13	1999-11-09	99968849.2	2008-02-13	2019-11-09	1128786	Jal S Jassawalla Donald T Shannon Herbert Chen
171	C00015915.USI3	Endoscopic Cannulation Apparatus and Method	United States of America	Granted	2001-06-29	2003-02-20	10/370,018	2012-10-23	2027-07-08	8,292,908	Scott D Miles Timothy R. Nieman
172	C00015915.USU2	CANNULATION APPARATUS AND METHOD	United States of America	Granted	2001-06-29	2002-06-28	10/186,307	2012-08-14	2031-07-14	8,241,309	Scott D Miles Timothy R. Nieman Kent F. Beck
173	C00015916.USC2	Systems and Methods for Predicting Characteristics of an Artificial Heart Using an Artificial Neural Network	United States of America	Granted	2011-05-26	2014-09-09	14/480,836	2015-08-11	2031-05-26	9,104,977	W. Kurt Dobson Ken Poppleton
174	C00015916.USU1	SYSTEMS AND METHODS FOR PREDICTING CHARACTERISTICS OF AN ARTIFICIAL HEART USING AN ARTIFICIAL NEURAL NETWORK	United States of America	Granted		2011-05-26	13/116,960	2014-11-04	2032-11-23	8,880,450	W. Kurt Dobson Ken Poppleton
175	C00015918.EPN3	DIRECT SEQUENCE SPREAD SPECTRUM PREDICTIVE CABLE AND COMPONENT FAILURE TECHNOLOGY	European Patent	Converted	2010-06-22	2011-06-21	11730147.3	2018-09-26	2031-06-21	2585839	W. Kurt Dobson Gill Bearnson
176	C00015918.USU1	DIRECT SEQUENCE SPREAD SPECTRUM PREDICTIVE CABLE AND COMPONENT FAILURE TECHNOLOGY	United States of America	Granted		2010-06-22	12/820,884	2014-04-22	2031-11-03	8,706,431	W. Kurt Dobson Gill Bearnson
177	C00015920.EPN4	Rotary Blood Pump Diagnostics and Cardiac Output Controller	European Patent	Converted	2002-08-21	2003-08-21	03755746.9	2016-07-27	2023-08-21	1565231	Gill Bearnson Gordon B. Jacobs

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
178	C00015921.DE01	MAGNETICALLY-LEVITATED BLOOD PUMP WITH OPTIMIZATION METHOD ENABLING MINIATURIZATION	Germany (Federal Republic of)	Granted	2008-09-26	2009-09-24	09816862.8	2019-07-24	2029-09-24	60 2009 059 246.7	Michael Ricci Shaun T. Snyder Josiah E. Verkaik James Antaki David B. Paden Bradley E. Paden Jingchun Wu
179	C00015921.EPN5	MAGNETICALLY-LEVITATED BLOOD PUMP WITH OPTIMIZATION METHOD ENABLING MINIATURIZATION	European Patent	Converted	2008-09-26	2009-09-24	09816862.8	2019-07-24	2029-09-24	2340067	Michael Ricci Shaun T. Snyder Josiah E. Verkaik James Antaki David B. Paden Bradley E. Paden Jingchun Wu
180	C00015921.USN7	MAGNETICALLY-LEVITATED BLOOD PUMP WITH OPTIMIZATION METHOD ENABLING MINIATURIZATION	United States of America	Granted	2008-09-26	2009-09-24	13/054,903	2016-04-19	2031-11-09	9,314,557	Michael Ricci Shaun T. Snyder Josiah E. Verkaik Jingchun Wu James Antaki David B. Paden Bradley E. Paden
181	C00015921US01CON	Magnetically -Levitated Blood Pump with Optimization Method Enabling Miniaturization	United States of America	Granted	2008-09-26	2016-03-09	15/064,960	2020-11-17	2031-02-03	10,835,652	Michael Ricci James Antaki Josiah E. Verkaik David B. Paden Shaun T. Snyder Bradley E. Paden Jingchun Wu
182	C00015923.USC7	BLOOD PUMP WITH SEPARATE MIXED-FLOW AND AXIAL-FLOW IMPELLER STAGES, COMPONENTS THEREFOR AND RELATED METHODS	United States of America	Granted		2017-09-06	15/696,610	2019-08-06	2032-03-14	10,371,150	Jingchun Wu Josiah E. Verkaik
183	C00015923.USU6	Blood Pump with Separate Mixed-Flow and Axial-Flow Impeller Stages, Components Therefor and Related Methods	United States of America	Granted	2010-10-18	2011-10-18	13/275,912	2017-10-03	2035-02-10	9,775,936	Jingchun Wu Josiah E. Verkaik
184	C00015999.WO01	DETECTION OF NOISE SIGNALS IN CARDIAC SIGNALS	Patent Cooperation Treaty	Converted	2017-11-03	2018-10-29	PCT/US2018/057989		2020-07-03		Ya-Jian Cheng DAnne Kudlik
185											
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189	C00016099.US01	PUMP HOMEOSTASIS INDICATOR (PHI)	United States of America	Granted	2017-07-13	2018-07-03	16/026,760	2020-12-08	2037-11-09	10,856,804	Neil Voskoboynikov Veronica Ramos
190	C00016099.WO01	PUMP HOMEOSTASIS INDICATOR (PHI)	Patent Cooperation Treaty	Converted	2017-07-13	2018-07-03	PCT/US2018/040747		2020-03-13		Neil Voskoboynikov Veronica Ramos

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
191	C00016394.WO01	Method of Starting a Blood Pump with an Electrical Fault	Patent Cooperation Treaty	Converted	2018-09-19	2019-08-27	PCT/US2019/048222		2021-05-19		Carlos Reyes Justin Wolman-Miller Mark Egler
192	C00016394CN01	Method of Starting a Blood Pump with an Electrical Fault	China	Published	2018-09-19	2019-08-27	201980061230.X				Carlos Reyes Justin Wolman-Miller Mark Egler
193	C00016394EP01	Method of Starting a Blood Pump with an Electrical Fault	European Patent	Published	2018-09-19	2019-08-27	19765888.3				Carlos Reyes Justin Wolman-Miller Mark Egler
194	C00016490.EP04	HVAD CIRCADIAN TRACKER (PHI+)	European Patent	Converted	2017-07-13	2017-07-13	17743168.1	2022-03-30	2037-07-13	3651822	Neil Voskoboynikov Pedro Grave De Peralta Veronica Ramos
195	C00016490.USU1	HVAD CIRCADIAN TRACKER (PHI+)	United States of America	Granted		2017-07-13	15/648,735	2020-02-18	2037-11-09	10,561,774	Neil Voskoboynikov Pedro Grave De Peralta Veronica Ramos
196	C00016490.WOU2	HVAD CIRCADIAN TRACKER (PHI+)	Patent Cooperation Treaty	Converted		2017-07-13	PCT/US2017/041859		2020-03-13		Neil Voskoboynikov Pedro Grave De Peralta Veronica Ramos
197											
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201	C00016622.DEN8	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	Germany (Federal Republic of)	Granted	2004-05-25	2005-05-24	05755086.5	2015-08-19	2025-05-24	602005047290.8	Jeffrey A Larose
202	C00016622.EPN7	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	European Patent	Converted	2004-05-25	2005-05-24	05755086.5	2015-08-19	2025-05-24	1761306	Jeffrey A Larose Udai Singh
203	C00016622.USC4	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	United States of America	Granted	2004-05-25	2011-02-15	13/027,811	2013-08-13	2024-10-22	8,506,470	Jeffrey A Larose Udai Singh
204	C00016622.USC5	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	United States of America	Granted	2004-05-25	2013-07-11	13/939,964	2015-02-24	2024-05-25	8,961,390	Jeffrey A Larose Udai Singh
205	C00016622.USN3	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	United States of America	Granted	2004-05-25	2005-05-24	11/597,230	2011-02-15	2027-01-17	7,887,479	Jeffrey A Larose Udai Singh
206	C00016622.USU1	SENSORLESS FLOW ESTIMATION FOR IMPLANTED VENTRICLE ASSIST DEVICE	United States of America	Granted		2004-05-25	10/853,302	2009-09-22	2026-02-05	7,591,777	Jeffrey A Larose
207	C00016628.USU1	WIDE BLADE, AXIAL FLOW PUMP	United States of America	Granted		2004-12-03	11/003,810	2010-04-20	2027-10-20	7,699,586	Charles Shambaugh Jeffrey A Larose
208	C00016630.USU1	IMPELLER FOR A ROTARY VENTRICULAR ASSIST DEVICE	United States of America	Granted		2005-10-05	11/243,722	2013-04-16	2025-10-05	8,419,609	Jeffrey A Larose Charles Shambaugh Kartikeyan Trichi
209	C00016640.EPN4	KIT FOR IMPLANTATION OF A TRANSAPICAL VENTRICULAR ASSIST DEVICE	European Patent	Converted	2014-07-16	2015-07-15	15742503.4	2020-09-16	2035-07-15	3169384	Joel Graham Charles Shambaugh
210	C00016640.USU3	Implantation Of A Transapical Ventricular Assist Device And Kit For Same	United States of America	Granted	2014-07-16	2015-07-15	14/799,703	2017-05-23	2035-09-16	9,656011	Joel Graham Charles Shambaugh
211	C00016640.USV5	Implantation Of A Transapical Ventricular Assist Device And Kit For Same	United States of America	Granted	2014-07-16	2017-04-26	15/497,670	2019-06-25	2036-03-18	10,328,190	Joel Graham Charles Shambaugh
212	C00016647US01CON	IMPLANTABLE PUMP WITH TAPERED DIFFUSER REGION	United States of America	Granted	2014-08-08	2018-07-02	16/025,177	2020-08-04	2035-08-10	10,729,832	Mustafa Ertan Taskin

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
213	C00016650.CNN7	Controller and Power Source for Implantable Blood Pump	China	Granted	2010-12-09	2011-12-08	201180059728.6	2016-08-17	2031-12-08	ZL201180059728.6	Jeffrey A Larose John Rudser
214	C00016650.DEN11	CONTROLLER AND POWER SOURCE FOR IMPLANTABLE BLOOD PUMP	Germany (Federal Republic of)	Granted	2010-12-09	2011-12-08	11847061.6	2016-03-09	2031-12-08	602011023926.0	Jeffrey A Larose John Rudser
215	C00016650.EPN8	Controller and Power Source for Implantable Blood Pump	European Patent	Converted	2010-12-09	2011-12-08	11847061.6	2016-03-09	2031-12-08	2648775	Jeffrey A Larose John Rudser
216	C00016650.FRN12	Controller and Power Source for Implantable Blood Pump	France	Granted	2010-12-09	2011-12-08	11847061.6	2016-03-09	2031-12-08	2648775	Jeffrey A Larose John Rudser
217	C00016650.ILN9	Controller and Power Source for Implantable Blood Pump	Israel	Granted	2010-12-09	2011-12-08	226734	2016-11-01	2031-12-08	226734	Jeffrey A Larose John Rudser
218	C00016650.USD4	Controller for Implantable Blood Pump	United States of America	Granted	2010-12-09	2013-08-26	29/465,199	2016-03-08	2030-03-08	D751,200	Jeffrey A Larose John Rudser
219	C00016650.USU2	Controller and Power Source for Implantable Blood Pump	United States of America	Granted	2010-12-09	2011-12-08	13/314,875	2013-12-03	2031-12-08	8,597,350	Jeffrey A Larose John Rudser
220	C00016651.EPN4	CARDIAC SUPPORT SYSTEM AND METHODS	European Patent	Converted	2014-07-22	2015-07-22	15747893.4	2018-02-28	2035-07-22	3180050	Daniel Burkhoff
221	C00016651.USU2	Cardiac Support System and Methods	United States of America	Granted	2014-07-22	2015-07-22	14/806,228	2020-08-18	2035-07-22	10,744,255	Daniel Burkhoff
222	C00016653.DEN11	IMPLANT CONNECTOR	Germany (Federal Republic of)	Granted	2005-12-08	2006-12-08	06845159.0	2014-11-26	2026-12-08	602006043835.4	Jeffrey A Larose Richard Marquis Charles Shambaugh Daniel Tamez Virote Indravudh
223	C00016653.EPN10	IMPLANT CONNECTOR	European Patent	Converted	2005-12-08	2006-12-08	06845159.0	2014-11-26	2026-12-08	1958295	Jeffrey A Larose Richard Marquis Charles Shambaugh Daniel Tamez Virote Indravudh
224	C00016653.USU1	Implant Connector	United States of America	Granted		2005-12-08	11/298,410	2017-08-29	2030-09-04	9,744,279	Daniel Tamez Vitrote [[Virote]] Indravudh Jeffrey A Larose Richard Marquis Charles Shambaugh
225	C00016653.USV16	Implant Connector	United States of America	Granted	2005-12-08	2017-08-02	15/667,238	2020-02-25	2026-09-27	10,568,997	Daniel Tamez Virote Indravudh Jeffrey A Larose Richard Marquis Charles Shambaugh
226	C00016655.USC3	STABILIZING DRIVE FOR CONTACTLESS ROTARY BLOOD PUMP IMPELLER	United States of America	Granted	2006-01-13	2014-02-26	14/191,312	2015-06-09	2027-01-16	9,050,405	Jeffrey A Larose Charles Shambaugh
227	C00016655.USI2	STABILIZING DRIVE FOR CONTACTLESS ROTARY BLOOD PUMP IMPELLER	United States of America	Granted	2006-01-13	2011-07-12	13/181,240	2014-03-18	2027-05-19	8,672,611	Jeffrey A Larose Charles Shambaugh
228	C00016655.USU1	STABILIZING DRIVE FOR CONTACTLESS ROTARY BLOOD PUMP IMPELLER	United States of America	Granted	2006-01-13	2007-01-16	11/654,226	2011-07-12	2029-02-06	7,976,271	Jeffrey A Larose Charles Shambaugh
229	C00016656.EPN4	FAULT-TOLERANT POWER SUPPLY	European Patent	Converted	2010-10-12	2011-10-12	11833311.1	2019-06-26	2031-10-12	2628235	Craig Carder
230	C00016658.DE01	Implanted Device with Wireless Energy Transfer and External Alignment Feature	Germany (Federal Republic of)	Granted	2014-09-18	2015-09-17	15772150.7	2019-04-24	2035-09-17	60 2015 028 945.5	John Rudser
231	C00016658.EPN6	Implanted Device with Wireless Energy Transfer and External Alignment Feature	European Patent	Converted	2014-09-18	2015-09-17	15772150.7	2019-04-24	2035-09-17	3193960	John Rudser

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
232	C00016658.USU3	Implanted Device with Wireless Energy Transfer and External Alignment Feature	United States of America	Granted	2014-09-18	2015-09-17	14/857,130	2019-02-26	2035-09-17	10,213,538	John Rudser
233	C00016660.CNN6	Backup Controller System with Updating	China	Granted	2014-10-01	2015-09-22	201580065149.0	2019-12-17	2035-09-21	ZL201580065149.0	John Rudser
234	C00016660.EPN5	Backup Controller System with Updating	European Patent	Converted	2014-10-01	2015-09-22	15775548.9	2020-01-15	2035-09-22	3200846	John Rudser
235	C00016660DE01	Backup Controller System with Updating	Germany (Federal Republic of)	Granted	2014-10-01	2015-09-22	15775548.9	2020-01-15	2035-09-22	60 2015 045 658.0	John Rudser
236	C00016666.US01CON	FIDUCIAL POINT OPTIMIZATION	United States of America	Granted	2014-11-26	2018-09-07	16/124,944	2020-08-11	2035-11-24	10,737,006	Fernando Casas Antonio Ferreira Carlos Reyes Justin Wolman-Miller Luiz Silva Ferreira
237	C00016666.USU2	FIDUCIAL POINT OPTIMIZATION	United States of America	Granted	2014-11-26	2015-11-24	14/950,213	2017-06-13	2035-11-24	9,675,742	Fernando Casas Antonio Ferreira Carlos Reyes Justin Wolman-Miller
238	C00016669.EPN5	ANCHOR OR STAPLE WITH BARBS	European Patent	Converted	2015-06-23	2016-06-14	16732153.8	2019-07-31	2036-06-14	3313296	Lance Andrus
239	C00016670.EPN5	Mean Arterial Pressure Estimation	European Patent	Converted	2014-12-02	2015-11-25	15813177.1	2020-10-14	2035-11-25	3226928	Carlos Reyes Michael Brown
240	C00016676.DEN11	Intravascular Blood Pump and Method of Implantation	Germany (Federal Republic of)	Granted	2011-05-13	2012-05-11	12786270.4	2016-11-30	2032-05-11	602012026099.8	Lisa Ensz Martin Strueber
241	C00016676.EPN7	Intravascular Blood Pump and Method of Implantation	European Patent	Converted	2011-05-13	2012-05-11	12786270.4	2016-11-30	2032-05-11	2707053	Lisa Ensz Martin Strueber
242	C00016676.USU3	Intravascular Blood Pump and Method of Implantation	United States of America	Granted	2011-05-13	2012-05-11	13/469,925	2016-11-15	2032-05-11	9,492,600	Lisa Ensz Martin Strueber
243	C00016699.DE01	Flow Estimation in a Blood Pump	Germany (Federal Republic of)	Granted	2011-06-27	2012-06-26	12804685.1	2019-07-31	2032-06-26	60 2012 062 510.4	Heinrich Schima Marcus Granegger Francesco Moscato
244	C00016699.EPN4	Flow Estimation in a Blood Pump	European Patent	Converted	2011-06-27	2012-06-26	12804685.1	2019-07-31	2032-06-26	2723416	Heinrich Schima Marcus Granegger Francesco Moscato
245	C00016699.FR01	Flow Estimation in a Blood Pump	France	Granted	2011-06-27	2012-06-26	12804685.1	2019-07-31	2032-06-26	2723416	Heinrich Schima Marcus Granegger Francesco Moscato
246	C00016699.USU2	Flow Estimation in a Blood Pump	United States of America	Granted	2011-06-27	2012-06-26	13/533,437	2014-11-25	2032-07-09	8,897,873	Heinrich Schima Marcus Granegger Francesco Moscato
247	C00016700.EPN7	Ambulatory Lung Assist Device with Implanted Blood Pump and Oxygenator	European Patent	Converted	2012-04-06	2013-04-05	13772625.3	2017-06-07	2033-04-05	2833939	Martin Strueber
248	C00016700.USC11	AMBULATORY LUNG ASSIST DEVICE WITH IMPLANTED BLOOD PUMP AND OXYGENATOR	United States of America	Granted	2012-04-06	2017-07-19	15/654,102	2019-04-02	2033-04-05	10,245,367	Martin Strueber
249	C00016700.USC3	Ambulatory Lung Assist Device with Implanted Blood Pump and Oxygenator	United States of America	Granted	2012-04-06	2015-03-13	14/657,461	2016-03-08	2033-04-05	9,278,169	Martin Strueber
250	C00016700.USC4	Ambulatory Lung Assist Device with Implanted Blood Pump and Oxygenator	United States of America	Granted	2012-04-06	2016-01-28	15/008,653	2015-04-21	2033-04-05	9,011,311	Martin Strueber
251	C00016700.USU2	Ambulatory Lung Assist Device with Implanted Blood Pump and Oxygenator	United States of America	Granted	2012-04-06	2013-04-05	13/857,254	2015-04-21	2033-04-05	9,011,311	Martin Strueber
252	C00016701.USU3	Implantable Connector	United States of America	Granted	2014-12-17	2015-12-16	14/971,311	2017-11-14	2036-02-10	9,814,815	Tim McSweeney Michael Tajima Brad Aurilia

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
253	C00016707.USU2	Cardiac Pump Implantation Device and Method	United States of America	Granted	2014-12-10	2015-12-08	14/962,511	2017-11-21	2035-12-08	9,821,101	Lance Andrus
254	C00016710.USC6	Guidewire System and Method of Pump Installation Using Same	United States of America	Granted	2014-12-19	2017-07-11	15/646,433	2019-03-12	2035-12-15	10,226,559	James Schuermann
255	C00016710.USU2	Guidewire System and Method of Pump Installation Using Same	United States of America	Granted	2014-12-19	2015-12-15	14/969,805	2017-08-01	2035-12-15	9,717,831	James Schuermann
256	C00016713.US01CON	AXIAL FLOW ROTOR WITH DOWNSTREAM BEARING WASH FLOW	United States of America	Granted	2015-01-06	2018-09-07	16/124,277	2020-09-08	2035-07-04	10,765,788	Mustafa Ertan Taskin Ellen Keysselitz Wolfgang Kerkhoffs
257	C00016713.USU1	AXIAL FLOW ROTOR WITH DOWNSTREAM BEARING WASH FLOW	United States of America	Granted		2015-01-06	14/590,485	2017-08-01	2035-01-06	9,717,832	Mustafa Ertan Taskin Ellen Keysselitz Wolfgang Kerkhoffs
258	C00016722.EPN6	COMBINED TUNNELING TOOLS	European Patent	Converted	2015-02-13	2016-02-11	16712555.8	2019-08-28	2036-02-11	3256063	John Rudser
259	C00016722.US01DIV	Combined Tunneling Tools	United States of America	Granted	2015-02-13	2018-10-18	16/163,798	2020-10-13	2039-04-03	10,799,258	John Rudser
260	C00016722.USU2	Combined Tunneling Tools	United States of America	Granted	2015-02-13	2016-02-11	15/041,257	2018-11-06	2036-11-19	10,117,664	John Rudser
261	C00016725.CNN3	Methods and Systems for Adverse Event Prediction Using Pump Operating Data	China	Granted	2015-11-02	2016-11-01	201680064020.2	2024-03-19	2036-10-31	ZL201680064020.2	Zoe Demou Antonio Ferreira
262	C00016725.EPN4	Methods and Systems for Adverse Event Prediction Using Pump Operating Data	European Patent	Converted	2015-11-02	2016-11-01	16801632.7	2023-01-04	2036-11-01	3370797	Zoe Demou Antonio Ferreira
263	C00016725.US01DIV	Methods and Systems for Adverse Event Prediction Using Pump Operating Data	United States of America	Abandoned	2015-11-02	2019-03-08	16/296,510				Zoe Demou Antonio Ferreira
264	C00016725.USU2	Methods and Systems for Adverse Event Prediction Using Pump Operating Data	United States of America	Granted	2015-11-02	2016-11-01	15/340,174	2019-08-06	2037-03-01	10,368,757	Zoe Demou Antonio Ferreira
265	C00016725DE01	Methods and Systems for Adverse Event Prediction Using Pump Operating Data	Germany (Federal Republic of)	Granted	2015-11-02	2016-11-01	16801632.7	2023-01-04	2036-11-01	3370797	Zoe Demou Antonio Ferreira
266	C00016726.CNN4	BLOOD PUMP FOR TREATMENT OF BRADYCARDIA	China	Granted	2015-02-24	2016-02-09	201680011971.3	2021-03-12	2036-02-08	ZL201680011971.3	Barry M Yomtov
267	C00016726.DE01	BLOOD PUMP FOR TREATMENT OF BRADYCARDIA	Germany (Federal Republic of)	Granted	2015-02-24	2017-08-15	16756057.2	2019-08-14	2037-08-15	3261713	Barry M Yomtov
268	C00016726.EPN7	BLOOD PUMP FOR TREATMENT OF BRADYCARDIA	European Patent	Converted	2015-02-24	2017-08-15	16756057.2	2019-08-14	2037-08-15	3261713	Barry M Yomtov
269	C00016726.FR01	BLOOD PUMP FOR TREATMENT OF BRADYCARDIA	France	Granted	2015-02-24	2017-08-15	16756057.2	2019-08-14	2037-08-15	3261713	Barry M Yomtov
270	C00016726.USN3	BLOOD PUMP FOR TREATMENT OF BRADYCARDIA	United States of America	Granted	2015-02-24	2016-02-09	15/551,170	2019-04-02	2036-02-09	10,245,362	Barry M Yomtov
271	C00016727.EPN6	ELECTRONIC DEVICE HOLDER	European Patent	Converted	2015-05-27	2016-05-25	16727599.9	2020-10-14	2036-05-25	3304244	Lance Andrus
272	C00016727.USU2	ELECTRONIC DEVICE HOLDER	United States of America	Granted	2015-05-27	2016-05-25	15/163,810	2017-07-04	2036-05-25	9,698,851	Lance Andrus
273	C00016740.CNN5	CONNECTION SYSTEM WITH CLEANING	China	Granted	2015-07-31	2016-08-01	201680045167.7	2020-11-27	2036-07-31	ZL201680045167.7	John Rudser
274	C00016740.EPN4	CONNECTION SYSTEM WITH CLEANING	European Patent	Converted	2015-07-31	2016-08-01	16753514.5	2022-11-16	2036-08-01	3328311	John Rudser
275	C00016740.USU2	CONNECTION SYSTEM WITH CLEANING	United States of America	Granted	2015-07-31	2016-08-01	15/224,744	2020-09-01	2037-12-02	10,758,953	John Rudser
276	C00016740DE01	CONNECTION SYSTEM WITH CLEANING	Germany (Federal Republic of)	Granted	2015-07-31	2016-08-01	16753514.5	2022-11-16	2036-08-01	3328311	John Rudser
277	C00016740FR01	CONNECTION SYSTEM WITH CLEANING	France	Granted	2015-07-31	2016-08-01	16753514.5	2022-11-16	2036-08-01	3328311	John Rudser
278	C00016744.CNN4	Dilation Delivery System for a Medical Device	China	Granted	2015-08-28	2016-08-26	201680049718.7	2020-06-19	2036-08-25	ZL201680049718.7	Robert C Farnan
279	C00016744.US01CON	DILATION DELIVERY SYSTEM FOR A MEDICAL DEVICE	United States of America	Granted	2015-08-28	2019-04-29	16/397,147	2021-07-13	2037-01-22	11,058,851	Robert C Farnan
280	C00016744US01CON	DILATION DELIVERY SYSTEM FOR A MEDICAL DEVICE	United States of America	Published	2015-08-28	2021-06-22	17/353,996				Robert C Farnan

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
281	C00016747.DE01	Blood Pump for Ischemia Detection and Treatment	Germany (Federal Republic of)	Granted	2015-09-25	2016-09-23	16774824.3	2019-08-07	2036-09-23	3352809	Barry M Yomtov
282	C00016747.EPN5	Blood Pump for Ischemia Detection and Treatment	European Patent	Converted	2015-09-25	2016-09-23	16774824.3	2019-08-07	2036-09-23	3352809	Barry M Yomtov
283	C00016747.USU2	BLOOD PUMP FOR ISCHEMIA DETECTION AND TREATMENT	United States of America	Granted	2015-09-25	2016-09-23	15/274,470	2020-03-24	2037-01-28	10,596,307	Barry M Yomtov
284	C00016751.EPN5	Physiologically Responsive Blood Pump for Ischemia Detection and Treatment	European Patent	Converted	2015-10-23	2016-10-20	16788908.8	2020-09-16	2036-10-20	3365041	Barry M Yomtov
285	C00016754.DE01	Blood Pump with Restart Lockout	Germany (Federal Republic of)	Granted	2015-12-14	2016-12-13	16820122.6	2019-08-14	2036-12-13	3389738	Robert C Farnan
286	C00016754.EPN5	Blood Pump with Restart Lockout	European Patent	Converted	2015-12-14	2016-12-13	16820122.6	2019-08-14	2036-12-13	3389738	Robert C Farnan
287	C00016754.US01DIV	Blood Pump with Restart Lockout	United States of America	Granted	2015-12-14	2019-08-21	16/547,046	2021-11-30	2037-07-27	11,185,682	Robert C Farnan
288	C00016754US02CON	Blood Pump with Restart Lockout	United States of America	Published	2015-12-14	2021-11-02	17/516,757				Robert C Farnan
289	C00016755.EPN5	Hollow Plug	European Patent	Converted	2015-12-18	2016-12-16	16840354.1	2020-10-14	2036-12-16	3389739	Lance Andrus
290	C00016755DE01	Hollow Plug	Germany (Federal Republic of)	Granted	2015-12-18	2016-12-16	16840354.1	2020-10-14	2036-12-16	60 2016 045 996.5	Lance Andrus
291	C00016758.DE01	Multi-Piece Gimbal Ring	Germany (Federal Republic of)	Granted	2015-12-31	2016-12-29	16826658.3	2019-08-28	2036-12-29	3397300	Lance Andrus
292	C00016758EP01	Multi-Piece Gimbal Ring	European Patent	Converted	2015-12-31	2016-12-29	16826658.3	2019-08-28	2036-12-29	3397300	Lance Andrus
293	C00016760.CN01	Implantable Mechanical Circulatory Support Devices	China	Granted	2015-12-21	2016-12-20	201680074901.2	2020-06-30	2036-12-19	ZL201680074901.2	Jeffrey A. LaRose Mustafa Ertan Taskin Douglas Godshall Nick Youker Andre Simon
294	C00016760.US01DIV	Implantable Mechanical Circulatory Support Devices	United States of America	Granted	2015-12-21	2019-08-01	16/528,730	2021-06-08	2036-12-20	11,027,113	Douglas Godshall Mustafa Ertan Taskin Jeffrey A Larose Nick Youker Andre Simon
295	C00016760DE01	Implantable Mechanical Circulatory Support Devices	Germany (Federal Republic of)	Granted	2015-12-21	2016-12-20	16823481.3	2023-01-25	2036-12-20	3393541	Jeffrey A Larose Mustafa Ertan Taskin Nick Youker Douglas Godshall
296	C00016760EP01	Implantable Mechanical Circulatory Support Devices	European Patent	Converted	2015-12-21	2016-12-20	16823481.3	2023-01-25	2036-12-20	3393541	Jeffrey A Larose Mustafa Ertan Taskin Nick Youker Douglas Godshall
297	C00016764.USU2	Axial Flow Implantable Mechanical Circulatory Support Devices with Outlet Volute	United States of America	Granted	2015-12-21	2016-12-20	15/385,480	2019-08-27	2037-09-12	10,391,217	Mustafa Ertan Taskin Charles Shambaugh
298	C00016764DE01	Axial Flow Implantable Mechanical Circulatory Support Devices with Outlet Volute	Germany (Federal Republic of)	Granted	2015-12-21	2016-12-20	16823483.9	2023-01-25	2036-12-20	3393542	Charles Shambaugh Mustafa Ertan Taskin
299	C00016764EP01	Axial Flow Implantable Mechanical Circulatory Support Devices with Outlet Volute	European Patent	Converted	2015-12-21	2016-12-20	16823483.9	2023-01-25	2036-12-20	3393542	Charles Shambaugh Mustafa Ertan Taskin
300	C00016767.USU3	PUMP MOTOR CONTROL WITH ADAPTIVE STARTUP	United States of America	Granted	2015-12-28	2016-12-28	15/391,997	2020-08-04	2036-12-28	10,732,583	John Rudser
301	C00016767DE01	Pump Motor Control with Adaptive Startup	Germany (Federal Republic of)	Granted	2015-12-28	2016-12-28	16826638.5	2023-07-26	2036-12-28	3397298	John Rudser
302	C00016767EP01	Pump Motor Control with Adaptive Startup	European Patent	Converted	2015-12-28	2016-12-28	16826638.5	2023-07-26	2036-12-28	3397298	John Rudser

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303	C00016767US01CON	PUMP MOTOR CONTROL WITH ADAPTIVE STARTUP	United States of America	Granted	2015-12-28	2020-06-24	16/910,509	2021-09-28	2036-12-28	11,131,968	John Rudser
304	C00016767US02CON	PUMP MOTOR CONTROL WITH ADAPTIVE STARTUP	United States of America	Granted	2015-12-28	2021-08-26	17/412,980			11,977,357	John Rudser
305	C00016769.USU2	VAD Controller Tester	United States of America	Granted	2015-12-28	2016-12-28	15/392,390	2019-12-03	2037-12-26	10,493,190	John Rudser
306	C00016769DE01	VAD Controller Tester	Germany (Federal Republic of)	Granted	2015-12-28	2016-12-28	16826646.8	2023-02-22	2036-12-28	3397299	John Rudser
307	C00016769EP01	VAD Controller Tester	European Patent	Converted	2015-12-28	2016-12-28	16826646.8	2023-02-22	2036-12-28	3397299	John Rudser
308	C00016793.CNN6	Multiband Wireless Power System	China	Granted	2013-08-19	2014-08-18	201480057271.9	2017-12-29	2034-08-18	ZL201480057271.9	Jeffrey A Larose John Rudser
309	C00016793.EPN7	Multiband Wireless Power System	European Patent	Converted	2013-08-19	2014-08-18	14759389.1	2018-11-14	2034-08-18	3035975	Jeffrey A Larose John Rudser
310	C00016793.US01CON	MULTIBAND WIRELESS POWER SYSTEM	United States of America	Granted	2013-08-19	2018-11-13	16/188,968	2020-03-24	2034-08-18	10,601,241	John Rudser
311	C00016793.USC12	MULTIBAND WIRELESS POWER SYSTEM	United States of America	Granted	2013-08-19	2017-05-16	15/596,740	2018-06-05	2034-08-18	9,991,734	John Rudser
312	C00016793.USC13	MULTIBAND WIRELESS POWER SYSTEM	United States of America	Granted	2013-08-19	2018-05-10	15/976,475	2018-12-11	2034-08-18	10,153,655	John Rudser
313	C00016793.USU2	Multiband Wireless Power System	United States of America	Granted	2013-08-19	2014-08-18	14/461,612	2017-06-13	2035-03-20	9,680,330	John Rudser
314	C00016793DE01	Multiband Wireless Power System	Germany (Federal Republic of)	Granted	2013-08-19	2014-08-18	14759389.1	2018-11-14	2034-08-18	60 2014 036 040.8	Jeffrey A Larose John Rudser
315	C00016796.DEN12	Low-Power Battery Pack with Safety System	Germany (Federal Republic of)	Granted	2012-05-24	2013-05-23	13726402.4	2016-09-14	2033-05-23	602013011547.8	Jonathan Hardy Jonathan Eagle
316	C00016796.EPN8	Low-Power Battery Pack with Safety System	European Patent	Converted	2012-05-24	2013-05-23	13726402.4	2016-09-14	2033-05-23	2856190	Heinrich Schima Marcus Granegger Francesco Moscato
317	C00016796.EPV18	LOW-POWER BATTERY MONITORING WITH SAFETY SYSTEM	European Patent	Converted	2012-05-24	2013-05-23	16186987.0	2020-08-19	2033-05-23	3136117	Jonathan Hardy Jonathan Eagle
318	C00016797.EPN4	Coring Tool	European Patent	Converted	2012-08-23	2013-08-23	13830516.4	2017-11-15	2033-08-23	2887888	William Trueba
319	C00016797.US01DIV	Coring Tool	United States of America	Granted	2012-08-23	2018-10-16	16/161,675	2022-03-01	2034-06-04	11,259,827	William Trueba
320	C00016798.CNN6	VAD INTEGRATED FLOW SENSOR	China	Granted	2012-09-05	2013-09-05	201380057534.1	2017-04-19	2033-09-05	ZL201380057534.1	Neil Voskoboynikov Daniel Tamez
321	C00016798.EPN7	VAD INTEGRATED FLOW SENSOR	European Patent	Converted	2012-09-05	2013-09-05	13835446.9	2023-01-25	2033-09-05	2892583	Neil Voskoboynikov Daniel Tamez
322	C00016798.USC12	VAD INTEGRATED FLOW SENSOR	United States of America	Granted	2012-09-05	2017-01-13	15/406,078	2018-01-09	2033-09-05	9,861,730	Daniel Tamez Neil Voskoboynikov
323	C00016798.USC13	VAD INTEGRATED FLOW SENSOR	United States of America	Granted	2012-09-05	2017-12-07	15/834,487	2020-09-29	2034-06-23	10,786,611	Daniel Tamez Neil Voskoboynikov
324	C00016798.USU2	VAD INTEGRATED FLOW SENSOR	United States of America	Granted	2012-09-05	2013-09-05	14/019,219	2017-02-28	2033-09-05	9,579,432	Daniel Tamez Neil Voskoboynikov
325	C00016798DE01	VAD INTEGRATED FLOW SENSOR	Germany (Federal Republic of)	Granted	2012-09-05	2013-09-05	13835446.9	2023-01-25	2033-09-05	602013083268.4	Neil Voskoboynikov Daniel Tamez
326	C00016800.USU2	Controller and Power Source for Implantable Blood Pump	United States of America	Granted	2013-01-04	2013-12-19	14/133,905	2016-06-14	2034-03-10	9,364,596	CHARLES J. VADALA Michael Ashenuga Jeffrey A Larose John Rudser
327	C00016800.USV13	CONTROLLER AND POWER SOURCE FOR IMPLANTABLE BLOOD PUMP	United States of America	Granted	2013-01-04	2015-09-02	14/843,424	2016-09-20	2033-12-19	9,446,180	CHARLES J. VADALA Michael Ashenuga Jeffrey A Larose John Rudser

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
328	C00016800.USV14	Controller and Power Source for Implantable Blood Pump	United States of America	Granted	2013-01-04	2015-09-02	14/843,529	2016-09-06	2033-12-19	9,433,716	CHARLES J. VADALA Michael Ashenuga Jeffrey A Larose John Rudser
329	C00016802.US01CON	BLOOD PUMP WITH SEPARATE MIXED-FLOW AND AXIAL-FLOW IMPELLER STAGES AND MULTI-STAGE STATORS	United States of America	Granted	2013-05-14	2018-09-12	16/128,806	2019-10-08	2034-05-14	10,434,232	Jingchun Wu David B. Paden Michael Ricci Shaun T. Snyder
330	C00016803.EPN4	Wire Scaffold Device for Ventricular Assist Device	European Patent	Converted	2013-07-30	2014-07-29	14750908.7	2021-10-13	2034-07-29	3027241	Jeff Colella
331	C00016803.USU2	Wire Scaffold Device for Ventricular Assist Device	United States of America	Granted	2013-07-30	2014-07-24	14/339,801	2018-05-15	2034-09-03	9,968,719	Jeff Colella
332	C00016805.DEN8	Pass Through Assembly	Germany (Federal Republic of)	Granted	2013-08-28	2014-08-28	14771428.1	2018-01-03	2034-08-28	602014019451.6	John Rudser Alfredo Garcell
333	C00016805.EPN4	PASS-THROUGH ASSEMBLY	European Patent	Converted	2013-08-28	2014-08-28	14771428.1	2018-01-03	2034-08-28	3038669	John Rudser Alfredo Garcell
334	C00016805.USN5	Pass-Through Assembly	United States of America	Granted	2013-08-28	2014-08-28	14/915,083	2017-10-10	2034-08-28	9,782,598	John Rudser Alfredo Garcell
335	C00016806.USU1	Surgical Tool for Coring Precise Holes and Providing for Retrieval of Tissue	United States of America	Granted		2006-01-13	11/332,016	2019-08-06	2028-09-09	10,368,899	Rajesh Pandey
336	C00016807.AUN3	ROTARY BLOOD PUMP	Australia	Granted	2006-01-13	2007-01-12	2007207782	2013-01-10	2027-01-12	2007207782	Jeffrey A Larose Richard K. Wampler Virote Indravudh
337	C00016807.CNN17	ROTARY BLOOD PUMP	China	Granted	2006-01-13	2007-01-12	200780003014.7	2013-07-31	2027-01-12	ZL0780003014.7	Jeffrey A Larose Richard K. Wampler Virote Indravudh
338	C00016807.CNV18	ROTARY BLOOD PUMP	China	Granted	2006-01-13	2007-01-12	201310285851.0	2016-12-28	2027-01-12	ZL201310285851.0	Jeffrey A Larose Richard K. Wampler Virote Indravudh
339	C00016807.EP01DIV	Rotary Blood Pump	European Patent	Converted	2007-01-12	2007-01-12	18199912.9	2022-03-02	2027-01-12	3477103	Jeffrey A Larose Richard K. Wampler Virote Indravudh
340	C00016807.EPN12	Rotary Blood Pump	European Patent	Converted	2006-01-13	2007-01-12	07709705.3	2018-10-24	2027-01-12	1977110	Jeffrey A Larose Richard K. Wampler Virote Indravudh
341	C00016807.JPN9	ROTARY BLOOD PUMP	Japan	Granted	2006-01-13	2007-01-12	2008-550412	2012-12-14	2027-01-12	5155186	Jeffrey A Larose Richard K. Wampler Virote Indravudh
342	C00016807.JPV13	ROTARY BLOOD PUMP	Japan	Granted	2006-01-13	2007-01-12	2012-116644	2014-05-09	2027-01-12	5539441	Jeffrey A Larose Richard K. Wampler Virote Indravudh
343	C00016807.USC15	HYDRODYNAMIC THRUST BEARINGS FOR ROTARY BLOOD PUMP	United States of America	Granted	2006-01-13	2013-07-31	13/955,955	2017-10-03	2028-10-02	9,777,732	Jeffrey A Larose Charles Shambaugh
344	C00016807.USC19	HYDRODYNAMIC THRUST BEARINGS FOR ROTARY BLOOD PUMP	United States of America	Granted	2006-01-13	2017-08-29	15/689,567	2020-08-04	2027-12-18	10,731,652	Jeffrey A Larose Charles Shambaugh
345	C00016807.USU5	Hydrodynamic Thrust Bearings for Rotary Blood Pumps	United States of America	Granted	2006-01-13	2007-01-16	11/654,216	2013-08-20	2027-04-24	8,512,013	Jeffrey A Larose Charles Shambaugh

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
346	C00016807DE02	Rotary Blood Pump	Germany (Federal Republic of)	Granted	2007-01-12	2007-01-12	18199912.9	2022-03-02	2027-01-12	60 2007 061 442.2	Jeffrey A Larose Richard K. Wampler Virote Indravudh
347	C00016808.USC2	Rotary Pump with Thrust Bearings	United States of America	Granted	2006-01-13	2011-08-04	13/198,315	2013-09-24	2027-01-16	8,540,477	Jeffrey A Larose Charles Shambaugh
348	C00016808.USC4	Rotary Pump with Thrust Bearings	United States of America	Granted	2006-01-13	2014-12-11	14/567,194	2016-01-26	2027-01-16	9,242,032	Jeffrey A Larose Charles Shambaugh
349	C00016810.EPN4	Surgical Tool	European Patent	Converted	2006-01-23	2007-01-23	07762580.4	2018-05-16	2027-01-23	1993640	Rajesh Pandey
350	C00016810.USC5	SURGICAL TOOL	United States of America	Granted	2006-01-23	2011-12-09	13/316,291	2017-07-04	2026-04-08	9,693,791	Rajesh Pandey
351	C00016810.USU1	Surgical Tool	United States of America	Granted		2006-01-23	11/337,708	2012-01-03	2028-02-03	8,088,138	Rajesh Pandey
352	C00016812.USD1	Control Panel	United States of America	Granted		2007-02-28	29/273,244	2010-12-28	2024-12-28	D629,763	[[Admin User]] Jane Reedy
353	C00016813.DE01	Centrifugal Rotary Blood Pump	Germany (Federal Republic of)	Granted	2007-04-30	2008-04-30	08754140.5	2019-10-02	2028-04-30	60 2008 061 334.8	Jeffrey A Larose Lisandro Rivera Charles Shambaugh Kartikeyan Trichi Daniel White
354	C00016813.EPN4	Centrifugal Rotary Blood Pump	European Patent	Converted	2007-04-30	2008-04-30	08754140.5	2019-10-02	2028-04-30	2145108	Jeffrey A Larose Lisandro Rivera Charles Shambaugh Kartikeyan Trichi Daniel White
355	C00016813.JPN5	Centrifugal Rotary Blood Pump	Japan	Granted	2007-04-30	2008-04-30	2010-506303	2013-12-27	2028-04-30	5442598	Jeffrey A Larose Lisandro Rivera Charles Shambaugh Daniel White
356	C00016813.JPV6	Centrifugal Rotary Blood Pump	Japan	Granted	2007-04-30	2008-04-30	2013-193571	2016-09-23	2028-04-30	6009421	Jeffrey A Larose Lisandro Rivera Charles Shambaugh Daniel White
357	C00016813.USU2	Centrifugal Rotary Blood Pump with Impeller Having a Hydrodynamic Thrust Bearing Surface	United States of America	Granted	2007-04-30	2008-04-30	12/150,662	2012-04-10	2029-11-29	8,152,493	Jeffrey A Larose Lisandro Rivera Charles Shambaugh Kartikeyan Trichi Daniel White
358	C00016814.USU2	Surgical Tool	United States of America	Granted	2007-07-23	2008-07-23	12/220,388	2015-01-06	2030-01-07	8,926,646	Charles Shambaugh Rajesh Pandey
359	C00016816.EPN8	Ventricular Assist Device for Intraventricular Placement	European Patent	Converted	2008-02-08	2009-02-06	09707311.8	2018-10-03	2029-02-06	2249746	Jeffrey A Larose Charles Shambaugh Daniel Tamez Steve White
360	C00016816.USC13	VENTRICULAR ASSIST DEVICE FOR INTRAVENTRICULAR PLACEMENT	United States of America	Granted	2008-11-07	2015-09-28	14/867,696	2017-02-28	2029-02-06	9,579,437	Jeffrey A Larose Charles Shambaugh Daniel Tamez Steve White

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361	C00016816.USC14	VENTRICULAR ASSIST DEVICE FOR INTRAVENTRICULAR PLACEMENT	United States of America	Granted	2008-11-07	2017-01-26	15/416,404	2018-05-01	2029-02-06	[[9956333]] 9,956,333	Jeffrey A Larose Charles Shambaugh Daniel Tamez Steve White
362	C00016816.USU3	Ventricular Assist Device for Intraventricular Placement	United States of America	Granted	2008-02-08	2009-02-06	12/322,746	2014-10-07	2031-05-02	8,852,072	Jeffrey A Larose Charles Shambaugh Daniel Tamez Steve White
363	C00016816.USV12	Ventricular Assist Device for Intraventricular Placement	United States of America	Granted	2008-02-08	2014-08-28	14/471,783	2015-11-03	2029-02-06	9,173,984	Jeffrey A Larose Charles Shambaugh Daniel Tamez Steve White
364	C00016817.CNV13	PLATINUM-COBALT-BORON BLOOD PUMP ELEMENT	China	Granted	2008-02-08	2009-02-06	201210409170.6	2016-06-22	2029-02-06	ZL1210409170.6	Jeffrey A Larose Charles Shambaugh
365	C00016817.DEN8	PLATINUM-COBALT-BORON BLOOD PUMP ELEMENT	Germany (Federal Republic of)	Granted	2008-02-08	2009-02-06	09708643.3	2016-05-04	2029-02-06	602009038359.0	Jeffrey A Larose Charles Shambaugh
366	C00016817.EPN5	Platinum_Cobalt-Boron Blood Pump Element	European Patent	Converted	2008-02-08	2009-02-06	09708643.3	2016-05-04	2029-02-06	2249895	Jeffrey A Larose Charles Shambaugh
367	C00016819.CAN5	TET System for Implanted Medical Device	Canada	Granted	2008-09-10	2009-09-10	2734775	2015-02-03	2029-09-10	2734775	Barry M Yomtov John Robert Batty Jr.
368	C00016819.CAV12	TET System for Implanted Medical Device	Canada	Granted	2008-09-10	2009-09-10	2870934	2017-08-15	2029-09-10	2870934	Barry M Yomtov John Robert Batty Jr.
369	C00016819.CNN6	TET System for Implanted Medical Device	China	Granted	2008-09-10	2009-09-10	200980136037.4	2014-11-05	2029-09-10	ZL0980136037.4	Barry M Yomtov John Robert Batty Jr.
370	C00016819.DE01	TET System for Implanted Medical Device	Germany (Federal Republic of)	Granted	2008-09-10	2009-09-10	09813371.3	2018-12-12	2029-09-10	60 2009 056 196.0	Barry M Yomtov John Robert Batty, Jr.
371	C00016819.EP01DIV	TET System for Implanted Medical Device	European Patent	Converted	2008-09-10	2009-09-10	18206007.9	2021-10-27	2029-09-10	3485936	Barry M Yomtov John Robert Batty, Jr.
372	C00016819.EPN7	TET System for Implanted Medical Device	European Patent	Converted	2008-09-10	2009-09-10	09813371.3	2018-12-12	2029-09-10	2334370	Barry M Yomtov John Robert Batty, Jr.
373	C00016819.JPN10	TET System for Implanted Medical Device	Japan	Granted	2008-09-10	2009-09-10	2011-526064	2015-05-15	2029-09-10	5745410	Barry M Yomtov John Robert Batty Jr.
374	C00016819.US01CON	TET SYSTEM FOR IMPLANTED MEDICAL DEVICE	United States of America	Granted	2008-09-10	2018-11-02	16/179,016	2019-09-17	2029-09-10	10,413,651	Barry M Yomtov John Robert Batty, Jr.
375	C00016819.USC16	TET SYSTEM FOR IMPLANTED MEDICAL DEVICE	United States of America	Granted	2008-09-10	2015-10-15	14/884,000	2016-11-29	2029-09-19	9,504,775	Barry M Yomtov John Robert Batty Jr.
376	C00016819.USC17	TET SYSTEM FOR IMPLANTED MEDICAL DEVICE	United States of America	Granted	2008-09-10	2016-11-23	15/360,127	2017-09-26	2029-09-10	9,770,544	Barry M Yomtov John Robert Batty Jr.
377	C00016819.USC18	TET SYSTEM FOR IMPLANTED MEDICAL DEVICE	United States of America	Granted	2008-09-10	2017-09-06	15/696,279	2018-11-27	2029-09-10	10,137,232	Barry M Yomtov John Robert Batty Jr.
378	C00016819.USU2	TET System for Implanted Medical Device	United States of America	Granted	2008-09-10	2009-09-10	12/584,776	2013-12-17	2032-09-12	8,608,635	Barry M Yomtov John Robert Batty Jr.
379	C00016819.USV15	TET System for Implanted Medical Device	United States of America	Granted	2008-09-10	2013-11-01	14/070,165	2015-11-24	2029-11-27	9,192,704	Barry M Yomtov John Robert Batty Jr.
380	C00016819DE02	TET System for Implanted Medical Device	Germany (Federal Republic of)	Granted	2008-09-10	2009-09-10	18206007.9	2021-10-27	2029-09-10	60 2009 064 134.4	Barry M Yomtov John Robert Batty, Jr.
381	C00016819EP02DIV	TET System for Implanted Medical Device	European Patent	Published	2008-09-10	2009-09-10	21190112.9			EP3928826	Barry M Yomtov John Robert Batty, Jr.
382	C00016820.CNN7	Hard-Wired Implanted Controller System	China	Granted	2009-09-21	2010-09-21	201080041999.4	2014-12-17	2030-09-21	ZL1080041999.4	Barry M Yomtov John Robert Batty Jr. Daniel Tamez
383	C00016820.DEN15	Hard-Wired Implanted Controller System	Germany (Federal Republic of)	Granted	2009-09-21	2010-09-21	10818025.8	2016-11-09	2030-09-21	602010037907.8	Barry M Yomtov John Robert Batty Jr. Daniel Tamez
384	C00016820.EPN8	Hard-Wired Implanted Controller System	European Patent	Converted	2009-09-21	2010-09-21	10818025.8	2016-11-09	2030-09-21	2480284	Barry M Yomtov John Robert Batty Jr. Daniel Tamez

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
385	C00016820.USU3	Hard-Wired Implanted Controller System	United States of America	Granted	2009-09-21	2010-09-20	12/886,369	2014-01-14	2031-12-01	8,628,460	Barry M Yomtov John Robert Batty, Jr. Daniel Tamez
386	C00016820US01CON	HARD-WIRED IMPLANTED CONTROLLER SYSTEM	United States of America	Granted	2009-09-21	2018-09-06	16/123,446	2020-06-30	2030-09-20	10,695,477	Barry M Yomtov John Robert Batty, Jr. Daniel Tamez
387	C00016821.EPN4	PHYSIOLOGICALLY RESPONSIVE VAD	European Patent	Converted	2010-01-19	2011-01-18	11735036.3	2019-03-13	2031-01-18	2525870	Barry M Yomtov
388	C00016821.US01CON	PHYSIOLOGICALLY RESPONSIVE VAD	United States of America	Granted	2010-01-19	2018-10-26	16/172,041	2019-07-09	2031-01-18	10,342,907	Barry M Yomtov
389	C00016821.USC5	PHYSIOLOGICALLY RESPONSIVE VAD	United States of America	Granted	2010-01-19	2014-09-11	14/483,251	2017-02-28	2031-01-18	9,579,435	Barry M Yomtov
390	C00016821.USC6	PHYSIOLOGICALLY RESPONSIVE VAD	United States of America	Granted	2010-01-19	2016-09-28	15/278,851	2017-12-05	2031-01-18	9,833,552	Barry M Yomtov
391	C00016821.USC7	PHYSIOLOGICALLY RESPONSIVE VAD	United States of America	Granted	2010-01-19	2017-11-30	15/827,763	2018-11-13	2031-01-18	10,124,099	Barry M Yomtov
392	C00016821.USU2	PHYSIOLOGICALLY RESPONSIVE VAD	United States of America	Granted	2010-01-19	2011-01-18	13/008,514	2014-10-21	2031-01-18	8,864,644	Barry M Yomtov
393	C00016822.EPN4	Hydrodynamic Chamfer Thrust Bearing	European Patent	Converted	2010-06-18	2011-06-17	11796539.2	2021-08-04	2031-06-17	2582414	Daniel White
394	C00016823.EPN4	CONDUIT DEVICE FOR USE WITH A VENTRICULAR ASSIST DEVICE	European Patent	Converted	2010-08-06	2011-08-05	11815382.4	2021-10-13	2031-08-05	2600918	Jeffrey A Larose Douglas Godshall
395	C00016823.USU2	CONDUIT DEVICE FOR USE WITH A VENTRICULAR ASSIST DEVICE	United States of America	Granted	2010-08-06	2011-08-05	13/204,472	2014-10-28	2031-08-05	8,870,739	Jeffrey A Larose Douglas Godshall
396	C00016823DE01	CONDUIT DEVICE FOR USE WITH A VENTRICULAR ASSIST DEVICE	Germany (Federal Republic of)	Granted	2010-08-06	2011-08-05	11815382.4	2021-10-13	2031-08-05	60 2011 071 941.6	Jeffrey A Larose Douglas Godshall
397	C00016824.AUN4	Silver Motor Stator for Implantable Blood Pump	Australia	Granted	2012-05-11	2013-05-10	2013259287	2013-05-10	2033-05-10	2013259287	Jeffrey A Larose
398	C00016824.CNN6	Silver Motor Stator for Implantable Blood Pump	China	Granted	2012-05-11	2013-05-10	201380024631.0	2017-03-29	2033-05-10	ZL201380024631.0	Jeffrey A Larose
399	C00016824.JPN10	Silver Motor Stator for Implantable Blood Pump	Japan	Granted	2012-05-11	2013-05-10	2015-511767	2017-08-10	2033-05-10	6190451	Jeffrey A Larose
400	C00016824.USC12	SILVER MOTOR STATOR FOR IMPLANTABLE BLOOD PUMP	United States of America	Granted	2012-05-11	2017-12-06	15/833,322	2020-12-29	2034-03-21	10,874,780	Jeffrey A Larose
401	C00016824.USU2	SILVER MOTOR STATOR FOR IMPLANTABLE BLOOD PUMP	United States of America	Granted	2012-05-11	2013-05-10	13/891,785	2017-12-26	2033-08-12	9,849,223	Jeffrey A Larose
402	C00016829.CNN8	Improvements in Transcutaneous Energy Transfer Systems	China	Granted	2014-04-15	2015-04-14	201580032050.0	2020-08-04	2035-04-13	ZL201580032050.0	Jeffrey A Larose John Rudson Ramiro Gomez
403	C00016829.EPN5	Improvements in Transcutaneous Energy Transfer Systems	European Patent	Converted	2014-04-15	2015-04-14	15772043.4	2018-07-25	2035-04-14	3131601	Jeffrey A Larose John Rudser Ramiro Gomez
404	C00016829.US01DIV	Transcutaneous Energy Transfer Systems	United States of America	Granted	2014-04-15	2018-11-14	16/190,471	2021-01-05	2035-09-09	10,881,773	John Rudser Jeffrey A Larose Ramiro Gomez
405	C00016829.USU2	Transcutaneous Energy Transfer Systems	United States of America	Granted	2014-04-15	2015-04-14	14/686,067	2018-12-04	2035-07-19	10,143,788	John Rudser Ramiro Gomez Jeffrey A Larose
406	C00016829DE01	Transcutaneous Energy Transfer Systems	Germany (Federal Republic of)	Granted	2014-04-15	2015-04-14	15772043.4	2018-07-25	2035-04-14	3131601	Jeffrey A. LaRose John Rudser Ramiro Gomez
407	C00016830.DE02	IMPROVEMENTS IN TRANSCUTANEOUS ENERGY TRANSFER SYSTEMS	Germany (Federal Republic of)	Granted	2014-04-15	2015-04-14	17173659.8	2018-12-05	2035-04-14	602015021116.2	John Rudser Stefan Schwarzbach
408	C00016830.EPN6	IMPROVEMENTS IN TRANSCUTANEOUS ENERGY TRANSFER SYSTEMS	European Patent	Converted	2014-04-15	2015-04-14	15718117.3	2018-06-06	2035-04-14	3131623	John Rudser Stefan Schwarzbach

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
409	C00016830.EPV12	IMPROVEMENTS IN TRANSCUTANEOUS ENERGY TRANSFER SYSTEMS	European Patent	Converted	2014-04-15	2015-04-14	17173659.8	2018-12-05	2035-04-14	3248650	John Rudser Stefan Schwarzbach
410	C00016830.EPV13	IMPROVEMENTS IN TRANSCUTANEOUS ENERGY TRANSFER SYSTEMS	European Patent	Converted	2014-04-15	2015-04-14	18170664.9	2020-01-22	2035-04-14	3378532	John Rudser Stefan Schwarzbach
411	C00016830.US01DIV	Transcutaneous Energy Transfer Systems	United States of America	Granted	2014-04-15	2019-06-27	16/454,704	2022-06-07	2036-05-09	11,351,360	John Rudser Stefan Schwarzbach
412	C00016830.USU2	Transcutaneous Energy Transfer Systems	United States of America	Granted	2014-04-15	2015-04-14	14/686,245	2019-08-13	2036-12-15	10,376,624	John Rudser Stefan Schwarzbach
413	C00016830DE01	IMPROVEMENTS IN TRANSCUTANEOUS ENERGY TRANSFER SYSTEMS	Germany (Federal Republic of)	Granted	2014-04-15	2015-04-14	15718117.3	2018-06-06	2035-04-14	3131623	John Rudser Stefan Schwarzbach
414	C00016831.USU3	Percutaneous Connector and Associated Methods of Use	United States of America	Granted	2014-06-12	2015-06-12	14/738,443	2017-05-09	2035-06-12	9,647,386	Lance Andrus Andre Castillo
415	C00016833.CNN6	IMPELLER FOR AXIAL FLOW PUMP	China	Granted	2013-08-14	2014-08-14	201480056247.3	2017-09-29	2034-08-14	ZL201480056247.3	Mustafa Ertan Taskin
416	C00016833.DEN13	Impeller for Axial Flow Pump	Germany (Federal Republic of)	Granted	2013-08-14	2014-08-14	14758047.6	2017-10-04	2034-08-14	602014015433.6	Mustafa Ertan Taskin
417	C00016833.EPN7	Impeller for Axial Flow Pump	European Patent	Converted	2013-08-14	2014-08-14	14758047.6	2017-10-04	2034-08-14	3033120	Mustafa Ertan Taskin
418	C00016833.USC15	IMPELLER FOR AXIAL FLOW PUMP	United States of America	Granted	2014-06-17	2018-03-22	15/928,231	2022-05-31	2036-02-20	11,344,716	Mustafa Ertan Taskin
419	C00016833.USU2	Impeller for Axial Flow Pump	United States of America	Granted	2013-08-14	2014-08-14	14/459,532	2017-02-07	2034-10-16	9,561,313	Mustafa Ertan Taskin
420	C00016833.USV12	Impeller for Axial Flow Pump	United States of America	Granted	2013-08-14	2016-12-28	15/392,847	2018-04-17	2034-08-14	[[9943630]] 9,943,630	Mustafa Ertan Taskin
421	C00016836.USU2	PUMP PRELOAD INDEX/INDICATOR	United States of America	Granted	2016-02-04	2017-02-03	15/424,057	2018-12-25	2037-04-20	10,159,775	Neil Voskoboynikov Pedro Grave De Peralta
422	C00016836.WOU3	Pump Capacity Work Index	Patent Cooperation Treaty	Converted	2016-02-04	2017-02-03	PCT/US2017/016495		2018-09-04		Neil Voskoboynikov Pedro Grave De Peralta
423	C00016836EP01	Pump Capacity Work Index	European Patent	Converted	2016-02-04	2017-02-03	17704972.3	2020-12-30	2037-02-03	3411091	Neil Voskoboynikov Pedro Grave De Peralta
424	C00016837.USU2	Power Supply with Vehicle Adapter and Battery	United States of America	Granted	2016-02-25	2017-02-24	15/441,567	2021-03-09	2038-07-27	10,940,250	John Rudser
425	C00016837.WOU3	Power Supply with Vehicle Adapter and Battery	Patent Cooperation Treaty	Converted	2016-02-25	2017-02-24	PCT/US2017/019352		2018-09-25		John Rudser
426	C00016837CN01	Power Supply with Vehicle Adapter and Battery	China	Published	2016-02-25	2017-02-24	201780012585.0				John Rudser
427	C00016838.WOU3	Skin Button with Flat Cable	Patent Cooperation Treaty	Converted	2016-03-02	2017-03-01	PCT/US2017/020215		2018-10-02		Tim McSweeney
428	C00016838EP01	Skin Button with Flat Cable	European Patent	Converted	2016-03-02	2017-03-01	17710108.6	2021-02-24	2037-03-01	3423126	Tim McSweeney
429	C00016839.USU2	Flanged Heart Tissue Blocker	United States of America	Granted	2016-03-30	2017-03-28	15/471,575	2018-12-25	2037-03-28	10,159,772	Jeffrey A Larose Lance Andrus
430	C00016839.WOU3	FLANGED HEART TISSUE BLOCKER	Patent Cooperation Treaty	Converted	2016-03-30	2017-03-28	PCT/US2017/024501		2018-10-30		Jeffrey A Larose Lance Andrus
431	C00016839EP01	Flanged Heart Tissue Blocker	European Patent	Converted	2016-03-30	2017-03-28	17716377.1	2021-04-28	2037-03-28	3436105	Jeffrey A. LaRose Lance Andrus
432	C00016839US01DIV	Flanged Heart Tissue Blocker	United States of America	Granted	2016-03-30	2018-07-11	16/032,514	2022-06-21	2037-03-28	11,364,374	Jeffrey A. LaRose Lance Andrus
433	C00016842.EP01	Blood Clot Filter with Local Thrombolytic Drug Delivery	European Patent	Converted	2016-05-06	2017-05-04	17723864.9	2023-10-18	2037-05-04	3451967	Gill Bearnson
434	C00016842.WOU3	BLOOD CLOT FILTER WITH LOCAL THROMBOLYTIC DRUG DELIVERY	Patent Cooperation Treaty	Converted	2016-05-06	2017-05-04	PCT/US2017/031017		2018-12-06		Gill Bearnson
435	C00016842DE01	Blood Clot Filter with Local Thrombolytic Drug Delivery	Germany (Federal Republic of)	Granted	2016-05-06	2017-05-04	17723864.9	2023-10-18	2037-05-04	60 2017 075 425.0	Gill Bearnson

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436	C00016844.EP01	Systems and Methods for Maintaining Fluid Balance	European Patent	Published	2016-07-01	2017-06-22	17734940.4				Fernando Casas
437	C00016844.USU2	SYSTEMS AND METHODS FOR MAINTAINING FLUID BALANCE	United States of America	Granted	2016-07-01	2017-06-22	15/630,373	2019-08-13	2037-07-18	10,376,621	Fernando Casas
438	C00016844.WOU3	Systems and Methods for Maintaining Fluid Balance	Patent Cooperation Treaty	Converted	2016-07-01	2017-06-22	PCT/US2017/038760		2019-02-01		Fernando Casas
439	C00016845.EP01	Ventricular Assist Devices and Intergrated Sensors Thereof	European Patent	Converted	2016-07-19	2017-07-18	17745602.7	2021-03-17	2037-07-18	3487548	Nathalie Nunez Tim McSweeney
440	C00016845.WOU3	VENTRICULAR ASSIST DEVICES AND INTEGRATED SENSORS THEREOF	Patent Cooperation Treaty	Converted	2016-07-19	2017-07-18	PCT/US2017/042576		2019-02-19		Nathalie Nunez Tim McSweeney
441	C00016846.EP01	SUCTION DETECTION DEVICES	European Patent	Converted	2016-08-01	2017-08-01	17751542.6	2020-10-14	2037-08-01	3490630	Neil Voskoboynikov Michael Brown
442	C00016846.USU2	SUCTION DETECTION METHODS AND DEVICES	United States of America	Granted	2016-08-01	2017-08-01	15/665,718	2020-06-09	2038-06-20	10,675,396	Michael Brown Neil Voskoboynikov
443	C00016846.WOU3	SUCTION DETECTION METHODS AND DEVICES	Patent Cooperation Treaty	Converted	2016-08-01	2017-08-01	PCT/US2017/044823		2019-03-01		Neil Voskoboynikov Michael Brown
444	C00016846DE01	SUCTION DETECTION DEVICES	Germany (Federal Republic of)	Granted	2016-08-01	2017-08-01	17751542.6	2020-10-14	2037-08-01	60 2017 025 516.5	Neil Voskoboynikov Michael Brown
445	C00016846US01DIV	SUCTION DETECTION METHODS AND DEVICES	United States of America	Published	2016-08-01	2020-04-28	16/860,594				Michael Brown Neil Voskoboynikov
446	C00016847.EP01	VAD with Aortic Valve Opening Detection	European Patent	Converted	2016-08-01	2017-07-25	17749101.6	2021-02-24	2037-07-25	3490628	Zoe Demou Pedro Grave De Peralta Carlos Reyes
447	C00016847.WOU3	VAD with Aortic Valve Opening Detection	Patent Cooperation Treaty	Converted	2016-08-01	2017-07-31	PCT/US2017/044698		2019-03-01		Zoe Demou Pedro Grave De Peralta Carlos Reyes
448	C00016848.EP01	Heart Rate Determination Based on VAD Current Waveform	European Patent	Converted	2016-08-01	2017-07-28	17749330.1	2020-05-13	2037-07-28	3490629	Carlos Reyes Justin Wolman-Miller Fernando Casas
449	C00016848.US01DIV	HEART RATE DETERMINATION BASED ON VAD CURRENT WAVEFORM	United States of America	Granted	2016-08-01	2019-08-07	16/534,615	2021-10-26	2038-01-07	11,154,701	Carlos Reyes Fernando Casas Justin Wolman-Miller
450	C00016848.WOU3	Heart Rate Determination Based on VAD Current Waveform	Patent Cooperation Treaty	Converted	2016-08-01	2017-07-28	PCT/US2017/044459		2019-03-01		Carlos Reyes Justin Wolman-Miller Fernando Casas
451	C00016848CN02DIV	Heart Rate Determination Based on VAD Current Waveform	China	Published	2016-08-01	2017-07-28	202110779051.9				Carlos Reyes Justin Wolman-Miller Fernando Casas
452	C00016849.CN01	Evacuating Fluid Surrounding Devices Implanted in Body	China	Allowed	2016-08-08	2017-08-07	201780048880.1				John Rudser
453	C00016849.WOU3	Evacuating Fluid Surrounding Devices Implanted in Body	Patent Cooperation Treaty	Converted	2016-08-08	2017-08-07	PCT/US2017/045737		2019-03-08		John Rudser
454	C00016853.EPV14	Rotary Blood Pump with Ceramic Members	European Patent	Converted	1998-12-28	1999-11-10	08157724.9	2018-09-12	2019-11-10	1958652	David Lancisi Hengchu Cao
455	C00016860.AUN4	Self-Adhesive TET Coil Holder with Alignment Feature	Australia	Granted	2012-06-11	2013-06-11	2013274484	2013-06-11	2033-06-11	2013274484	[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopher Page

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
456	C00016860.EPN7	Self-Adhesive TET Coil Holder with Alignment Feature	European Patent	Converted	2012-06-11	2013-06-11	13804392.2	2022-03-23	2033-06-11	2858718	[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopl Page
457	C00016860.USU2	Self-Adhesive TET Coil Holder with Alignment Feature	United States of America	Granted	2012-06-11	2013-06-11	13/915,332	2016-03-01	2033-09-13	9,272,081	[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopl Page
458	C00016860.WOU3	Self-Adhesive TET Coil Holder with Alignment Feature	Patent Cooperation Treaty	Converted	2012-06-11	2013-06-11	PCT/US2013/045174		2015-01-11		[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopl Page
459	C00016860DE01	Self-Adhesive TET Coil Holder with Alignment Feature	Germany (Federal Republic of)	Granted	2012-06-11	2013-06-11	13804392.2	2022-03-23	2033-06-11	60 2013 081 197.0	[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopl Page
460	C00016860FR01	Self-Adhesive TET Coil Holder with Alignment Feature	France	Granted	2012-06-11	2013-06-11	13804392.2	2022-03-23	2033-06-11	2858718	[[UNKNOWN]]CAMERON, Allan [[(AC1)]] Christopl Page
461	C00016867.USU2	Crenellated Inflow Cannula	United States of America	Granted	2016-03-31	2017-03-29	15/472,669	2020-01-07	2037-10-04	10,525,179	Jeffrey A. LaRose Charles Shambaugh Mustafa Ertan Taskin
462	C00016867.WOU3	Crenellated Inflow Cannula	Patent Cooperation Treaty	Converted	2016-03-31	2017-03-29	PCT/US2017/024693		2018-10-31		Jeffrey A. LaRose Charles Shambaugh Mustafa Ertan Taskin
463	C00016867CN01	Crenellated Inflow Cannula	China	Published	2016-03-31	2017-03-29	201780020477.8				Jeffrey A Larose Charles Shambaugh Mustafa Ertan Taskin
464	C00016867EP01	Crenellated Inflow Cannula	European Patent	Converted	2016-03-31	2017-03-29	17716042.1	2021-04-28	2037-03-29	3436104	Jeffrey A. LaRose Charles Shambaugh Mustafa Ertan Taskin
465	C00016868.EPN5	HEART ASSIST SYSTEM	European Patent	Converted	2006-01-27	2007-01-26	07717446.4	2019-03-06	2027-01-26	1981585	Oliver Marseille Wolfgang Kerkhoffs
466	C00016868.USC7	HEART ASSIST SYSTEM	United States of America	Granted	2006-01-27	2012-03-14	13/419,745	2013-06-18	2027-01-26	8,465,410	Oliver Marseille Wolfgang Kerkhoffs
467	C00016868.USU2	HEART ASSIST SYSTEM	United States of America	Granted	2006-01-27	2007-01-26	11/627,444	2012-04-17	2029-09-06	8,157,720	Oliver Marseille Wolfgang Kerkhoffs
468	C00016869.DEN15	Devices And Systems For Establishing Supplemental Blood Flow In The Circulatory System	Germany (Federal Republic of)	Granted	2006-08-30	2007-08-28	13173762.9	2015-01-14	2027-08-28	602007040092.9	Oliver Marseille Wolfgang Kerkhoffs
469	C00016869.DEN20	Devices, Methods And Systems For Establishing Supplemental Blood Flow In The Circulatory System	Germany (Federal Republic of)	Granted	2006-08-30	2007-08-28	14196639.0	2016-05-25	2027-08-28	602007046489.7	Oliver Marseille Wolfgang Kerkhoffs
470	C00016869.DEN9	SYSTEMS FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	Germany (Federal Republic of)	Granted	2006-08-30	2007-08-28	07814495.3	2013-08-14	2027-08-28	602007032278.2	Oliver Marseille Wolfgang Kerkhoffs
471	C00016869.USC29	Devices, Methods And Systems For Establishing Supplemental Blood Flow In The Circulatory System	United States of America	Granted	2006-08-30	2017-01-17	15/407,538	2018-02-27	2027-08-28	9,901,667	Oliver Marseille Wolfgang Kerkhoffs
472	C00016869.USC30	Devices, Methods And Systems For Establishing Supplemental Blood Flow In The Circulatory System	United States of America	Granted	2006-08-30	2018-01-23	15/878,058	2020-05-05	2028-02-14	10,639,410	Oliver Marseille Wolfgang Kerkhoffs
473	C00016869.USU2	Devices, Methods And Systems For Establishing Supplemental Blood Flow In The Circulatory System	United States of America	Granted	2006-08-30	2009-02-25	12/392,623	2017-02-21	2028-07-11	9,572,917	Oliver Marseille Wolfgang Kerkhoffs

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
474	C00016870.EPN5	DEVICES FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	European Patent	Converted	2010-02-11	2011-02-11	11742866.4	2019-01-02	2031-02-11	2533824	Robert C Farnan Oliver Marseille Wolfgang Kerkhoffs
475	C00016871.DEN7	DEVICE FOR ESTABLISHING SUPPLEMENTAL CIRCULATORY BLOOD FLOW	Germany (Federal Republic of)	Granted	2006-08-30	2008-08-01	08835271.1	2016-01-06	2028-08-01	602008041919.3	Robert C Farnan Oliver Marseille Wolfgang Kerkhoffs
476	C00016871.USC13	Systems for Establishing Supplemental Blood Flow in the Circulatory System	United States of America	Granted	2006-08-30	2016-12-28	15/392,528	2017-11-07	2027-08-28	9,808,564	Robert C Farnan Oliver Marseille Wolfgang Kerkhoffs
477	C00016871.USC14	SYSTEMS FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	United States of America	Granted	2008-08-01	2017-11-02	15/801,618	2019-12-31	2027-08-28	10,518,011	Robert C Farnan Oliver Marseille Wolfgang Kerkhoffs
478	C00016871.USV11	METHODS FOR ESTABLISHING SUPPLEMENTAL BLOOD FLOW IN THE CIRCULATORY SYSTEM	United States of America	Granted	2006-08-30	2011-02-07	13/022,105	2017-02-14	2031-08-19	9,566,375	Robert C Farnan Oliver Marseille Wolfgang Kerkhoffs
479	C00016873.DEN8	Intravascular Blood Pump And Catheter	Germany (Federal Republic of)	Granted	2006-09-14	2007-09-14	07842515.4	2016-04-13	2027-09-14	602007045868.4	Robert C Farnan Oliver Marseille
480	C00016873.USU3	Intravascular Blood Pump And Catheter	United States of America	Granted	2006-09-14	2009-03-02	12/396,048	2013-10-01	2030-04-10	8,545,380	Robert C Farnan Oliver Marseille
481	C00016874.DEN16	Cannula for heart chamber implantation and related systems	Germany (Federal Republic of)	Granted	2007-07-19	2008-06-10	13151152.9	2016-12-07	2028-06-10	602008047820.3	Oliver Marseille Walid Aboulhosn
482	C00016874.DEN9	CANNULA FOR HEART CHAMBER IMPLANTATION AND RELATED SYSTEMS AND METHODS	Germany (Federal Republic of)	Granted	2007-07-19	2008-06-10	08770573.7	2013-01-16	2028-06-10	602008021721.3	Oliver Marseille Walid Aboulhosn
483	C00016874.EPN5	CANNULA FOR HEART CHAMBER IMPLANTATION AND RELATED SYSTEMS AND METHODS	European Patent	Converted	2007-07-19	2008-06-10	08770573.7	2013-01-16	2028-06-10	2170449	Oliver Marseille Walid Aboulhosn
484	C00016874.USU2	CANNULA FOR HEART CHAMBER IMPLANTATION AND RELATED SYSTEMS AND METHODS	United States of America	Granted	2007-07-19	2008-06-24	12/144,738	2013-10-01	2031-12-02	8,545,379	Oliver Marseille Walid Aboulhosn
485	C00016875.DEN13	CANNULA INSERTION DEVICES, SYSTEMS, AND METHODS INCLUDING A COMPRESSIBLE MEMBER	Germany (Federal Republic of)	Granted	2006-08-30	2008-08-01	15156083.6	2016-07-06	2028-08-01	602008045048.1	Oliver Marseille Wolfgang Kerkhoffs
486	C00016875.DEN6	CANNULA INSERTION DEVICES, SYSTEMS, AND METHODS INCLUDING A COMPRESSIBLE MEMBER	Germany (Federal Republic of)	Granted	2006-08-30	2008-08-01	08828615.8	2015-05-06	2028-08-01	602008038088.2	Oliver Marseille Wolfgang Kerkhoffs
487	C00016875.EPV12	CANNULA INSERTION DEVICES, SYSTEMS, AND METHODS INCLUDING A COMPRESSIBLE MEMBER	European Patent	Converted	2006-08-30	2008-08-01	15156083.6	2016-07-06	2028-08-01	2891502	Oliver Marseille Wolfgang Kerkhoffs
488	C00016875.USI1	CANNULA INSERTION DEVICES, SYSTEMS, AND METHODS INCLUDING A COMPRESSIBLE MEMBER	United States of America	Granted	2006-08-30	2007-08-29	11/846,886	2012-12-18	2029-05-14	8,333,686	Oliver Marseille Wolfgang Kerkhoffs
489	C00016877.EPN5	ENDOVASCULAR ANASTOMOTIC CONNECTOR DEVICE, DELIVERY SYSTEM, AND METHODS OF DELIVERY AND USE	European Patent	Converted	2009-09-14	2010-06-24	10815780.1	2016-08-10	2030-06-24	2477558	Robert C Farnan

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
490	C00016877.US01DIV	ENDOVASCULAR ANASTOMOTIC CONNECTOR DEVICE, DELIVERY SYSTEM, AND METHODS OF DELIVERY AND USE	United States of America	Granted	2009-09-14	2018-11-02	16/178,729	2022-02-08	2031-12-15	11,241,231	Robert C Farnan
491	C00016878.EPN5	COAXIAL TRANSSEPTAL GUIDE-WIRE AND NEEDLE ASSEMBLY	European Patent	Converted	2009-09-02	2010-06-08	10814108.6	2018-10-31	2030-06-08	2473224	Robert C Farnan
492	C00016879.DE01	TRANSSEPTAL CANNULA	Germany (Federal Republic of)	Granted	2007-10-24	2008-10-24	08841883.5	2019-10-02	2028-10-24	2203213	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
493	C00016879.EPN12	TRANSSEPTAL CANNULA, TIP, DELIVERY SYSTEM, AND METHOD	European Patent	Converted	2007-10-24	2014-03-05	14712471.3	2017-01-11	2034-03-05	2964287	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
494	C00016879.EPN5	TRANSSEPTAL CANNULA	European Patent	Converted	2007-10-24	2008-10-24	08841883.5	2019-10-02	2028-10-24	2203213	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
495	C00016879.USC22	TRANSSEPTAL CANNULA, TIP, DELIVERY SYSTEM, AND METHOD	United States of America	Granted	2007-10-24	2014-06-30	14/319,549	2015-05-05	2028-10-23	9,022,916	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
496	C00016879.USC23	TRANSSEPTAL CANNULA, TIP, DELIVERY SYSTEM, AND METHOD	United States of America	Granted	2007-10-24	2015-04-28	14/697,767	2015-12-15	2028-10-23	9,211,367	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
497	C00016879.USU2	TRANSSEPTAL CANNULA, TIP, DELIVERY SYSTEM, AND METHOD	United States of America	Granted	2007-10-24	2008-10-23	12/256,911	2013-01-01	2030-03-02	8,343,029	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
498	C00016879.USV18	METHODS OF SECURING A CANNULA ASSEMBLY, IMPLANTING A CIRCULATORY ASSIST SYSTEM AND CROSSING A TISSUE BARRIER	United States of America	Granted	2007-10-24	2011-04-18	13/088,616	2012-12-18	2028-10-23	8,333,687	Elizabeth Jung Scott A Olson Robert C Farnan Andrew J Dusbabek Robert G Hudgins
499	C00016879.USV19	ANCHORING GUIDE ELEMENT	United States of America	Granted	2007-10-24	2011-04-18	13/088,620	2013-03-12	2028-10-23	8,394,010	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
500	C00016879.USV21	TRANSSEPTAL CANNULA, TIP, DELIVERY SYSTEM, AND METHOD	United States of America	Granted	2007-10-24	2013-06-27	13/928,717	2014-07-22	2028-10-23	8,784,291	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
501	C00016880.USU2	TRANSSEPTAL CANNULA DEVICE, COAXIAL BALLOON DELIVERY DEVICE, AND METHODS OF USING THE SAME	United States of America	Granted	2009-03-27	2010-03-09	12/720,012	2013-06-11	2028-10-23	8,460,168	Robert C Farnan
502	C00016880.USV14	METHOD OF DELIVERING A TRANSSEPTAL CANNULA TO A HEART	United States of America	Granted	2009-03-27	2015-04-14	14/685,914	2016-08-16	2030-03-09	9,415,148	Robert C Farnan
503	C00016881.EPU4	TWO-PIECE TRANSSEPTAL CANNULA, DELIVERY SYSTEM, AND METHOD OF DELIVERY	European Patent	Converted	2009-03-27	2010-03-19	10250524.5	2018-03-07	2030-03-19	2233165	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
504	C00016881.JPV9	TWO-PIECE TRANSSEPTAL CANNULA, DELIVERY SYSTEM, AND METHOD OF DELIVERY	Japan	Granted	2009-03-27	2010-03-26	2014-099373	2017-06-23	2030-03-26	6161570	Robert C Farnan Andrew J Dusbabek Robert G Hudgins Elizabeth Jung Scott A Olson
505	C00016882.DE01	ENDOVASCULAR ANASTOMOTIC CONNECTOR	Germany (Federal Republic of)	Granted	2009-10-08	2010-09-08	10822399.1	2019-08-07	2030-09-08	2485785	Robert C Farnan
506	C00016882.EPN5	ENDOVASCULAR ANASTOMOTIC CONNECTOR	European Patent	Converted	2009-10-08	2010-09-08	10822399.1	2019-08-07	2030-09-08	2485785	Robert C Farnan
507	C00016882.USU2	TWO PIECE ENDOVASCULAR ANASTOMOTIC CONNECTOR	United States of America	Granted	2009-10-08	2010-08-31	12/872,394	2012-12-18	2031-04-14	8,333,727	Robert C Farnan
508	C00016883.USU2	TEST CONTROLLER FOR A ROTARY PUMP	United States of America	Granted	2010-02-16	2011-01-31	13/017,205	2017-12-12	2036-01-18	9,841,013	Oliver Marseille Christian W Vohburger
509	C00016884.EPN5	CANNULA STABILIZER	European Patent	Converted	2009-11-13	2010-11-08	10830560.8	2020-10-21	2030-11-08	2498859	Robert C Farnan Oliver Marseille
510	C00016884.USU2	CANNULA STABILIZER	United States of America	Granted	2009-11-13	2010-11-02	12/917,525	2012-11-13	2030-11-02	8,308,715	Robert C Farnan Oliver Marseille
511	C00016886.USV12	BIFURCATED OUTFLOW CANNULAE	United States of America	Granted	2009-11-09	2015-01-14	14/596,665	2017-10-31	2030-08-28	9,801,987	Robert C Farnan John Peter Budris
512	C00016887.EPN11	CANNULA LINED WITH TISSUE IN-GROWTH MATERIAL AND METHOD OF USING THE SAME	European Patent	Converted	2011-08-05	2011-08-05	11870615.9	2016-07-06	2031-08-05	2739347	Robert C Farnan Oliver Marseille
513	C00016887.EPN5	CANNULA LINED WITH TISSUE IN-GROWTH MATERIAL	European Patent	Converted	2010-02-11	2011-02-11	11742879.7	2018-11-14	2031-02-11	2533825	Robert C Farnan Oliver Marseille
514	C00016887.USC9	CANNULA LINED WITH TISSUE IN-GROWTH MATERIAL	United States of America	Granted	2010-02-11	2011-08-05	13/204,201	2017-09-05	2031-02-11	9,750,866	Robert C Farnan Oliver Marseille
515	C00016887.USU2	CANNULA LINED WITH TISSUE IN-GROWTH MATERIAL AND METHOD OF USING THE SAME	United States of America	Granted	2010-02-11	2011-02-11	13/025,845	2016-11-29	2031-02-11	9,504,776	Robert C Farnan Oliver Marseille

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
516	C00016888.USU1	PUMP	United States of America	Granted	2004-03-18	2005-03-18	11/084,452	2013-08-20	2027-03-18	8,512,012	Mustafa Akdis Lokesh H M Jan Reul Julian Paul Reul Helmut Reul Ramakrishnan S
517	C00016889.CNN6	CANNULA TIPS, TISSUE ATTACHMENT RINGS, AND METHODS OF DELIVERING AND USING THE SAME	China	Granted	2011-09-07	2012-09-06	201280053608.X	2016-08-17	2032-09-06	ZL201280053608.X	Robert C Farnan Bryan Patrick Fritz Arielle Drummond Sarah Kostanski JONATHAN B. O'KEEFE Tim Robinson Richard Wisdom RICH ABRAHAM Jerry R Brightbill
518	C00016890.USU1	By-Pass Shunt To Reduce Flow Output Of Circulatory Assist Device	United States of America	Granted	2011-12-09	2012-12-03	13/692,359	2017-08-08	2033-08-19	9,724,500	Robert C Farnan Bryan Patrick Fritz Yun Yi
519	C00016891.EPN3	MALLEABLE CANNULA	European Patent	Converted	2013-03-07	2014-01-30	14703752.7	2019-11-27	2034-01-30	2964303	Robert C Farnan
520	C00016893.USU2	BLOOD FLOW SYSTEM WITH VARIABLE SPEED CONTROL	United States of America	Granted	2012-09-13	2013-09-04	14/017,505	2019-07-09	2035-05-01	10,342,905	Wolfgang Kerkhoffs John Peter Budris Robert C Farnan Christopher J. Flaherty Oliver Marseille Michael Martin
521	C00016895.DEN12	IMPLANTABLE SYSTEM WITH SECURE REMOTE CONTROL	Germany (Federal Republic of)	Granted	2013-08-02	2014-08-01	14750960.8	2017-04-26	2034-08-01	602014009102.4	Oliver Marseille Tobias Schleicher Christopher J. Flaherty
522	C00016895.EPN7	IMPLANTABLE SYSTEM WITH SECURE REMOTE CONTROL	European Patent	Converted	2013-08-02	2014-08-01	14750960.8	2017-04-26	2034-08-01	3027242	Oliver Marseille Tobias Schleicher Christopher J. Flaherty
523	C00016895.USU2	IMPLANTABLE BLOOD FLOW SYSTEM WITH SECURE REMOTE CONTROL	United States of America	Granted	2013-08-02	2014-08-01	14/449,423	2016-04-05	2034-08-01	9,302,035	Oliver Marseille Tobias Schleicher Christopher J. Flaherty
524	C00016896.EPN4	SYSTEM AND METHOD OF FACILITATING CONNECTION BETWEEN CANNULAE AND A BLOOD PUMP	European Patent	Converted	2013-06-26	2014-06-25	14739332.6	2021-10-27	2034-06-25	3013384	Bryan Patrick Fritz Oliver Marseille Scott A Olson Grant Thompson Murat Camkiran Robert C Farnan Andrew J Dusbabek

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
525	C00016896.USU2	SYSTEM AND METHOD OF FACILITATING CONNECTION BETWEEN CANNULAE AND A BLOOD PUMP	United States of America	Granted	2013-06-26	2014-06-24	14/313,270	2019-10-22	2037-08-17	10,449,274	Bryan Patrick Fritz Oliver Marseille Scott A Olson Grant Thompson Murat Camkiran Robert C Farnan Andrew J Dusbabek
526	C00016896DE01	SYSTEM AND METHOD OF FACILITATING CONNECTION BETWEEN CANNULAE AND A BLOOD PUMP	Germany (Federal Republic of)	Granted	2013-06-26	2014-06-25	14739332.6	2021-10-27	2034-06-25	60 2014 080 882.4	Bryan Patrick Fritz Oliver Marseille Scott A Olson Grant Thompson Murat Camkiran Robert C Farnan Andrew J Dusbabek
527	C00016898.CNN6	IMPLANTABLE CONNECTOR ASSEMBLY AND METHOD OF COMMUNICATING AN ELEMENT TO AN IMPLANTABLE DEVICE	China	Granted	2012-10-01	2013-09-30	201380061348.5	2017-03-29	2033-09-30	ZL201380061348.5	Wolfgang Kerkhoffs Christopher J. Flaherty Ellen Keysselitz
528	C00016898.EPN7	IMPLANTABLE CONNECTOR ASSEMBLY AND METHOD OF COMMUNICATING AN ELEMENT TO AN IMPLANTABLE DEVICE	European Patent	Converted	2012-10-01	2013-09-30	13844497.1	2020-01-08	2033-09-30	2903683	Wolfgang Kerkhoffs Josef Weigand Christopher J. Flaherty Ellen Keysselitz
529	C00016898.USU2	IMPLANTABLE CONNECTOR ASSEMBLY AND METHOD OF COMMUNICATING AN ELEMENT TO AN IMPLANTABLE DEVICE	United States of America	Granted	2012-10-01	2013-09-30	14/432,548	2019-02-26	2034-10-14	10,213,536	Wolfgang Kerkhoffs Ellen Keysselitz Christopher J. Flaherty Josef Weigand
530	C00016898DE01	IMPLANTABLE CONNECTOR ASSEMBLY AND METHOD OF COMMUNICATING AN ELEMENT TO AN IMPLANTABLE DEVICE	Germany (Federal Republic of)	Granted	2012-10-01	2013-09-30	13844497.1	2020-01-08	2033-09-30	60 2013 064 944.8	Wolfgang Kerkhoffs Josef Weigand Christopher J. Flaherty Ellen Keysselitz
531	C00016899.EPN5	HEART ASSIST SYSTEMS AND METHODS	European Patent	Converted	2014-05-20	2015-05-19	15729606.2	2021-12-15	2035-05-19	3145558	Robert C Farnan John Dockter Robert G Hudgins
532	C00016899.USC7	HEART ASSIST SYSTEMS AND METHODS	United States of America	Granted	2014-05-20	2017-12-19	15/847,338	2021-10-26	2036-07-12	11,154,704	Robert C Farnan John Dockter Robert G Hudgins
533	C00016899.USU2	HEART ASSIST SYSTEM AND METHODS	United States of America	Granted	2014-05-20	2015-05-19	14/715,794	2018-01-09	2036-07-12	9,861,728	Robert C Farnan John Dockter Robert G Hudgins
534	C00016900.EPN6	MALLEABLE CANNULA	European Patent	Converted	2014-08-29	2015-07-24	15747330.7	2018-09-26	2035-07-24	3185923	Robert C Farnan Arielle Drummond
535	C00016900.USU2	MALLEABLE CANNULA	United States of America	Granted	2014-08-29	2015-07-22	14/805,942	2017-10-10	2035-09-15	9,782,559	Robert C Farnan Arielle Drummond
536	C00016901.EPN4	INFLOW CANNULA AND BLOOD ASSIST SYSTEM	European Patent	Converted	2015-10-28	2015-11-06	15794795.3	2019-08-07	2035-11-06	3368098	Robert C Farnan
537	C00016901.USU1	INFLOW CANNULA AND BLOOD FLOW ASSIST SYSTEM	United States of America	Granted		2015-10-28	14/924,842	2017-08-01	2035-10-28	9,717,830	Robert C Farnan

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
538	C00016902.DE01	INFLOW CANNULA TUNNELING TOOL ALLOWING QUICK EXCHANGE WITH DILATING PLUG	Germany (Federal Republic of)	Granted	2015-05-07	2016-04-27	16789763.6	2019-06-05	2036-04-27	60 2016 014 927.3	Robert C Farnan Cesar Gomez Brad Aurilia
539	C00016902.EPN5	INFLOW CANNULA TUNNELING TOOL ALLOWING QUICK EXCHANGE WITH DILATING PLUG	European Patent	Converted	2015-05-07	2016-04-27	16789763.6	2019-06-05	2036-04-27	3300484	Robert C Farnan Cesar Gomez Brad Aurilia
540	C00016902.USC6	INFLOW CANNULA TUNNELING TOOL ALLOWING QUICK EXCHANGE WITH DILATING PLUG	United States of America	Granted	2015-05-07	2018-05-16	15/980,842	2020-08-04	2035-05-07	10,729,831	Robert C Farnan Cesar Gomez Brad Aurilia
541	C00016902.USU1	INFLOW CANNULA TUNNELING TOOL ALLOWING QUICK EXCHANGE WITH DILATING PLUG	United States of America	Granted		2015-05-07	14/706,226	2018-06-12	2035-05-07	9,993,587	Robert C Farnan Cesar Gomez Brad Aurilia
542	C00016902.WOU2	INFLOW CANNULA TUNNELING TOOL ALLOWING QUICK EXCHANGE WITH DILATING PLUG	Patent Cooperation Treaty	Converted	2015-05-07	2016-04-27	PCT/US2016/029416		2017-12-07		Robert C Farnan Cesar Gomez Brad Aurilia
543	C00016909.EPN4	Axial Flow Pump Pressure Algorithm	European Patent	Converted	2013-06-04	2014-06-04	14737077.9	2023-02-22	2034-06-04	3003420	Carlos Reyes Justin Wolman-Miller Fernando Casas
544	C00016909.USU2	Axial Flow Pump Pressure Algorithm	United States of America	Granted	2013-06-04	2014-06-03	14/294,448	2016-08-30	2034-12-10	9,427,508	Carlos Reyes Justin Wolman-Miller Fernando Casas
545	C00016909DE01	Axial Flow Pump Pressure Algorithm	Germany (Federal Republic of)	Granted	2013-06-04	2014-06-04	14737077.9	2023-02-22	2034-06-04	60 2014 086 271.3	Carlos Reyes Justin Wolman-Miller Fernando Casas
546	C00016910.EPN4	Anchored Mounting Ring	European Patent	Converted	2013-10-22	2014-10-21	14793396.4	2018-09-12	2034-10-21	3060271	Lance Andrus
547	C00016913.EPN4	APPARATUS AND METHODS FOR CUTTING AN ATRIAL WALL	European Patent	Converted	2013-12-04	2014-12-04	14867008.6	2020-02-05	2034-12-04	3076884	Paul A. Spence Robert Acland Landon Tompkins
548	C00016913.USU2	Apparatus and Methods for Cutting an Atrial Wall	United States of America	Granted	2013-12-04	2014-12-04	14/560,512	2017-11-07	2035-02-20	9,808,283	Paul A. Spence Robert Acland Landon Tompkins
549	C00016916.EPN4	Pump	European Patent	Converted	2004-03-18	2005-03-17	05738776.3	2011-07-27	2025-03-17	1727988	Helmut Reul Mustafa Akdis
550	C00016921.CN01	CENTER ROD MAGNET	China	Published	2017-05-19	2018-05-18	201880032101.3				Charles Shambaugh Mustafa Ertan Taskin Stanley Mack Jeffrey A. LaRose
551	C00016922.EP01	Intra Ventricular Ambulatory Implantable PV Loop System	European Patent	Converted	2017-05-16	2018-05-10	18727593.8	2022-03-30	2038-05-10	3624867	Fernando Casas
552	C00016922.USU2	Intra Ventricular Ambulatory Implantable PV Loop System	United States of America	Granted	2017-05-16	2018-05-10	15/975,936	2020-12-08	2038-12-11	10,856,745	Fernando Casas
553	C00016922.WOU3	Intra Ventricular Ambulatory Implantable PV Loop System	Patent Cooperation Treaty	Converted	2017-05-16	2018-05-10	PCT/US2018/031971		2020-01-16		Fernando Casas
554	C00016922DE01	Intra Ventricular Ambulatory Implantable PV Loop System	Germany (Federal Republic of)	Granted	2017-05-16	2018-05-10	18727593.8	2022-03-30	2038-05-10	60 2018 032 973.0	Fernando Casas
555	C00016922US01DIV	Intra Ventricular Ambulatory Implantable PV Loop System	United States of America	Granted	2017-05-16	2020-11-03	17/087,744	2023-11-28	2038-12-12	11,826,127	Fernando Casas

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
556	C00016923.EP01	Anti-Thrombus Surface Potential Ceramic Element	European Patent	Converted	2017-04-25	2018-04-06	18720877.2	2021-03-24	2038-04-06	3615103	Fernando Casas
557	C00016923.USU2	ANTI-THROMBUS SURFACE POTENTIAL CERAMIC ELEMENT	United States of America	Granted	2017-04-25	2018-04-06	15/946,892	2022-07-19	2038-04-06	11,389,639	Fernando Casas
558	C00016923.WOU3	Anti-Thrombus Surface Potential Ceramic Element	Patent Cooperation Treaty	Converted	2017-04-25	2018-04-06	PCT/US2018/026488		2019-12-25		Fernando Casas
559	C00016923DE01	Anti-Thrombus Surface Potential Ceramic Element	Germany (Federal Republic of)	Granted	2017-04-25	2018-04-06	18720877.2	2021-03-24	2038-04-06	60 2018 014 392.0	Fernando Casas
560	C00016925.USU2	Patient Behavior Sensitive Controller	United States of America	Granted	2016-11-30	2017-11-29	15/825,602	2020-08-25	2038-08-04	10,751,455	John Rudser
561	C00016926.EP01	Single-Piece Volute	European Patent	Converted	2016-10-28	2017-10-27	17805313.8	2020-12-30	2037-10-27	3532122	Charles Shambaugh Mustafa Ertan Taskin
562	C00016926.WOU3	Single-Piece Volute	Patent Cooperation Treaty	Converted	2016-10-28	2017-10-27	PCT/US2017/058671		2019-05-28		Charles Shambaugh Mustafa Ertan Taskin
563	C00016927.WOU3	GROOVED CONNECTOR WITH LAND BRIDGE	Patent Cooperation Treaty	Converted	2016-10-26	2017-10-26	PCT/US2017/058403		2019-05-26		Tim McSweeney
564	C00016930.CN01	Implantable Pump Impeller thermal Knockdown	China	Granted	2016-09-29	2017-09-29	201780059177.0	2021-08-03	2037-09-28	ZL201780059177.0	Justin Wolman-Miller Fernando Casas Carlos Reyes
565	C00016930.EP01	Implantable Pump Impeller thermal Knockdown	European Patent	Converted	2016-09-29	2017-09-29	17784141.8	2020-12-30	2037-09-29	3519007	Justin Wolman-Miller Fernando Casas Carlos Reyes
566	C00016930.USU2	IMPLANTABLE PUMP IMPELLER THERMAL KNOCKDOWN	United States of America	Granted	2016-09-29	2017-09-29	15/719,719	2020-08-18	2038-08-03	10,744,247	Justin Wolman-Miller Fernando Casas Carlos Reyes
567	C00016930.WOU3	Implantable Pump Impeller Thermal Knockdown	Patent Cooperation Treaty	Converted	2016-09-29	2017-09-29	PCT/US2017/054220		2019-04-29		Justin Wolman-Miller Fernando Casas Carlos Reyes
568	C00016930DE01	Implantable Pump Impeller thermal Knockdown	Germany (Federal Republic of)	Granted	2016-09-29	2017-09-29	17784141.8	2020-12-30	2037-09-29	60 2017 030 558.8	Justin Wolman-Miller Fernando Casas Carlos Reyes
569	C00016931.EP01	Physiological Responsive VAD for Cardiac Events	European Patent	Published	2016-09-23	2017-09-19	17777741.4				Barry M Yomtov Fernando Casas
570	C00016931.USU2	PHYSIOLOGICALLY RESPONSIVE VAD FOR CARDIAC EVENTS	United States of America	Granted	2016-09-23	2017-09-19	15/708,998	2020-10-20	2038-02-05	10,806,839	Barry M Yomtov Fernando Casas
571	C00016931.WOU3	PHYSIOLOGICALLY RESPONSIVE VAD FOR CARDIAC EVENTS	Patent Cooperation Treaty	Converted	2016-09-23	2017-09-19	PCT/US2017/052257		2019-04-23		Barry M Yomtov Fernando Casas
572	C00016932.CN01	Field-Oriented Control for Control of Blood Pump Motor	China	Published	2016-09-23	2017-09-20	201780058627.4				Carlos Reyes Justin Wolman-Miller Fernando Casas
573	C00016932.WOU3	FIELD-ORIENTED CONTROL FOR CONTROL OF BLOOD PUMP MOTOR	Patent Cooperation Treaty	Converted	2016-09-23	2017-09-20	PCT/US2017/052492		2019-04-23		Carlos Reyes Justin Wolman-Miller Fernando Casas
574	C00016933.CN01	Blood Pump with Sensors on Housing Surface	China	Granted	2016-09-23	2017-09-21	201780058639.7	2021-08-27	2037-09-20	ZL201780058639.7	Fernando Casas
575	C00016933.EP01	Blood Pump with Sensors on Housing Surface	European Patent	Converted	2016-09-23	2017-09-21	17778113.5	2020-12-30	2037-09-21	3515524	Fernando Casas
576	C00016933.USU2	Blood Pump with Sensors on Housing Surface	United States of America	Granted	2016-09-23	2017-09-21	15/711,532	2020-05-26	2037-10-14	10,660,997	Fernando Casas
577	C00016933.WOU3	Blood Pump with Sensors on Housing Surface	Patent Cooperation Treaty	Converted	2016-09-23	2017-09-21	PCT/US2017/052707		2019-04-23		Fernando Casas
578	C00016933DE01	Blood Pump with Sensors on Housing Surface	Germany (Federal Republic of)	Granted	2016-09-23	2017-09-21	17778113.5	2020-12-30	2037-09-21	60 2017 030 544.8	Fernando Casas

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
579	C00017031.US01	MAP ESTIMATION ON VAD PATIENTS	United States of America	Granted	2018-09-27	2019-09-17	16/573,011	2023-05-23	2042-02-28	11,653,841	Carlos Reyes Fernando Casas
580	C00017031.WO01	MAP ESTIMATION ON VAD PATIENTS	Patent Cooperation Treaty	Converted	2018-09-27	2019-09-17	PCT/US2019/051417		2021-05-27		Carlos Reyes Fernando Casas
581	C00017031CN01	MAP ESTIMATION ON VAD PATIENTS	China	Published	2018-09-27	2019-09-17	201980063986.8				Carlos Reyes Fernando Casas
582	C00017031DE01	MAP ESTIMATION ON VAD PATIENTS	Germany (Federal Republic of)	Granted	2018-09-27	2019-09-17	19779326.8	2023-01-18	2039-09-17	602019024574.2	Carlos Reyes Fernando Casas
583	C00017031EP01	MAP ESTIMATION ON VAD PATIENTS	European Patent	Converted	2018-09-27	2019-09-17	19779326.8	2023-01-18	2039-09-17	3856275	Carlos Reyes Fernando Casas
584	C00017070.US01	Heart Rate Measurement using Blood Pump Impeller Location	United States of America	Granted	2017-12-19	2018-12-17	16/221,768	2022-03-15	2039-12-16	11,273,299	Justin Wolman-Miller Fernando Casas Carlos Reyes
585	C00017070.WO01	Heart Rate Measurement using Blood Pump Impeller Location	Patent Cooperation Treaty	Converted	2017-12-19	2018-12-17	PCT/US2018/065936		2020-08-19		Justin Wolman-Miller Fernando Casas Carlos Reyes
586	C00017070CN01	Heart Rate Measurement using Blood Pump Impeller Location	China	Granted	2017-12-19	2018-12-17	201880081949.5	2023-11-07	2038-12-16	ZL201880081949.5	Justin Wolman-Miller Fernando Casas Carlos Reyes
587	C00017070EP01	Heart Rate Measurement using Blood Pump Impeller Location	European Patent	Allowed	2017-12-19	2018-12-17	18830655.9				Justin Wolman-Miller Fernando Casas Carlos Reyes
588	C00017070US01CON	Heart Rate Measurement using Blood Pump Impeller Location	United States of America	Published	2017-12-19	2022-03-14	17/654,724				Justin Wolman-Miller Fernando Casas Carlos Reyes
589	C00017115.USD1	HANDHELD CONTROLLER	United States of America	Granted		2013-08-26	29/465,201	2016-03-08	2030-03-08	D751,201	Jeffrey A Larose John Rudser
590	C00017131.CN01	DRIVE LINE INFECTION PREVENTION USING A FLEXIBLE ARTIFICIAL SKIN ULTRA VIOLET (UV) LIGHT EMITTER	China	Published	2017-09-26	2018-09-14	201880061869.3				Fernando Casas
591	C00017131.EP01	DRIVE LINE INFECTION PREVENTION USING A FLEXIBLE ARTIFICIAL SKIN ULTRA VIOLET (UV) LIGHT EMITTER	European Patent	Published	2017-09-26	2018-09-14	18779972.1				Fernando Casas
592	C00017131.US01	DRIVE LINE INFECTION PREVENTION USING A FLEXIBLE ARTIFICIAL SKIN ULTRA VIOLET (UV) LIGHT EMITTER	United States of America	Granted	2017-09-26	2018-09-14	16/131,340	2021-01-05	2039-03-01	10,881,768	Fernando Casas
593	C00017131.WO01	DRIVE LINE INFECTION PREVENTION USING A FLEXIBLE ARTIFICIAL SKIN ULTRA VIOLET (UV) LIGHT EMITTER	Patent Cooperation Treaty	Converted	2017-09-26	2018-09-14	PCT/US2018/051034		2020-05-26		Fernando Casas
594	C00017132.CN01	INSTRUMENTED DRIVELINE USING A FLEXIBLE ARTIFICIAL SKIN SENSORY ARRAY	China	Granted	2017-09-26	2018-09-14	201880062304.7	2023-05-30	2038-09-13	ZL201880062304.7	Fernando Casas
595	C00017132.EP01	INSTRUMENTED DRIVELINE USING A FLEXIBLE ARTIFICIAL SKIN SENSORY ARRAY	European Patent	Converted	2017-09-26	2018-09-14	18779968.9	2023-12-06	2038-09-14	3687596	Fernando Casas
596	C00017132.US01	INSTRUMENTED DRIVELINE USING A FLEXIBLE ARTIFICIAL SKIN SENSORY ARRAY	United States of America	Granted	2017-09-26	2018-09-14	16/131,238	2020-09-29	2038-11-14	10,786,612	Fernando Casas
597	C00017132.WO01	INSTRUMENTED DRIVELINE USING A FLEXIBLE ARTIFICIAL SKIN SENSORY ARRAY	Patent Cooperation Treaty	Converted	2017-09-26	2018-09-14	PCT/US2018/051013		2020-05-26		Fernando Casas

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
598	C00017132DE01	INSTRUMENTED DRIVELINE USING A FLEXIBLE ARTIFICIAL SKIN SENSORY ARRAY	Germany (Federal Republic of)	Granted	2017-09-26	2018-09-14	18779968.9	2023-12-06	2038-09-14	602018062247.0	Fernando Casas
599	C00017133.EP01	THERAPEUTIC UV BLOOD TREATMENT IN A BLOOD PUMP	European Patent	Converted	2017-08-18	2018-08-03	18756121.2	2021-10-20	2038-08-03	3668561	Fernando Casas
600	C00017133.US01	THERAPEUTIC UV BLOOD TREATMENT IN A BLOOD PUMP	United States of America	Granted	2017-08-18	2018-08-03	16/054,040	2020-08-18	2039-02-13	10,744,246	Fernando Casas
601	C00017133.WO01	THERAPEUTIC UV BLOOD TREATMENT IN A BLOOD PUMP	Patent Cooperation Treaty	Converted	2017-08-18	2018-08-03	PCT/US2018/045107		2020-04-18		Fernando Casas
602	C00017133DE01	THERAPEUTIC UV BLOOD TREATMENT IN A BLOOD PUMP	Germany (Federal Republic of)	Granted	2017-08-18	2018-08-03	18756121.2	2021-10-20	2038-08-03	60 2018 025 355.6	Fernando Casas
603	C00017134.EP01	THROMBUS DETECTION AND REMOVAL USING A FLEXIBLE ELECTRONIC SENSOR AND EMITTER	European Patent	Converted	2017-08-18	2018-08-02	18755645.1	2024-01-10	2038-08-02	3668560	Fernando Casas
604	C00017134.WO01	THROMBUS DETECTION AND REMOVAL USING A FLEXIBLE ELECTRONIC SENSOR AND EMITTER	Patent Cooperation Treaty	Converted	2017-08-18	2018-08-02	PCT/US2018/044907		2020-03-18		Fernando Casas
605	C00017134DE01	THROMBUS DETECTION AND REMOVAL USING A FLEXIBLE ELECTRONIC SENSOR AND EMITTER	Germany (Federal Republic of)	Granted	2017-08-18	2018-08-02	18755645.1	2024-01-10	2038-08-02	602018063982.9	Fernando Casas
606	C00017149.USU1	Updating a VAD system without stopping the pump	United States of America	Granted		2017-11-03	15/803,373	2021-09-07	2038-06-21	11,110,265	Thomas Johnson
607	C00017149.WO01	Updating a VAD system without stopping the pump	Patent Cooperation Treaty	Converted	2017-11-03	2018-10-26	PCT/US2018/057653		2020-07-03		Thomas Johnson
608	C00017149CN01	Updating a VAD system without stopping the pump	China	Published	2017-11-03	2018-10-26	201880071305.8				Thomas Johnson
609	C00017149US01DIV	Updating a VAD system without stopping the pump	United States of America	Published	2017-11-03	2021-08-04	17/393,606			12,009,094	Thomas Johnson
610	C00017193.US01	Dry Disconnect/Bubble Free Coupling for Blood Transfer	United States of America	Granted	2017-10-11	2018-10-02	16/149,391	2020-12-15	2038-12-16	10,864,364	Charles Shambaugh Stanley Mack
611	C00017193.WO01	DRY DISCONNECT/BUBBLE FREE COUPLING FOR BLOOD TRANSFER	Patent Cooperation Treaty	Converted	2017-10-11	2018-10-02	PCT/US2018/053893		2020-06-11		Charles Shambaugh Stanley Mack
612	C00017193US01CON	Dry Disconnect/Bubble Free Coupling for Blood Transfer	United States of America	Granted	2017-10-11	2020-08-04	16/984,315	2021-11-16	2038-10-02	11,173,295	Charles Shambaugh Stanley Mack
613	C00017194.US01	MAGNETICALLY SUSPENDED BLOOD DRIVING PISTON CIRCULATORY ASSIST DEVICE	United States of America	Granted	2017-10-04	2018-09-27	16/143,984	2022-03-15	2038-12-02	11,273,300	David Schafir
614	C00017194.WO01	Magnetically Suspended Blood Driving Piston Circulatory Assist Device	Patent Cooperation Treaty	Converted	2017-10-04	2018-09-27	PCT/US2018/053089		2020-06-04		David Schafir
615	C00017195.USU1	Intermediate Power Supply with Sensing and Communication System	United States of America	Granted		2017-11-14	15/812,566	2021-01-05	2039-07-01	10,886,021	John Rudser
616	C00017195.WO01	Intermediate Power Supply with Sensing and Communication System	Patent Cooperation Treaty	Converted	2017-11-14	2018-10-05	PCT/US2018/054512		2020-07-14		John Rudser
617	C00017195CN01	Intermediate Power Supply with Sensing and Communication System	China	Allowed	2017-11-14	2018-10-05	201880073587.5				John Rudser
618	C00017196.US01	Clinical Device with Data Transfer	United States of America	Granted	2018-06-25	2019-06-21	16/448,065	2022-04-12	2039-12-22	11,301,453	John Rudser
619	C00017196.WO01	Clinical Device with Data Transfer	Patent Cooperation Treaty	Converted	2018-06-25	2019-06-21	PCT/US2019/038387		2021-02-25		John Rudser
620	C00017196CN01	Clinical Device with Data Transfer	China	Published	2018-06-25	2019-06-21	201980037781.2				John Rudser

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
621	C00017200.WO01	HEAT EXCHANGE ASSEMBLY FOR FLOW CIRCUITS	Patent Cooperation Treaty	Converted	2018-05-17	2019-05-09	PCT/US2019/031489		2021-01-17		Zoe Demou Joshua Perez
622	C00017202.US01	VAD WITH INTRA-HOUSING FLUID ACCESS PORTS	United States of America	Granted	2017-11-06	2018-10-26	16/171,683	2021-07-13	2039-08-03	11,058,863	Zoe Demou
623	C00017202.WO01	VAD with Intra-Housing Fluid Access Ports	Patent Cooperation Treaty	Converted	2017-11-06	2018-10-26	PCT/US2018/057699		2020-07-06		Zoe Demou
624	C00017202US01CON	VAD WITH INTRA-HOUSING FLUID ACCESS PORTS	United States of America	Granted	2017-11-06	2021-06-16	17/348,945	2023-07-18	2039-02-21	11,701,510	Zoe Demou
625	C00017297.US01	TETS RECHARGED PATIENT ALERT SYSTEM FOR LVAD PATIENTS	United States of America	Granted	2018-02-21	2019-02-20	16/280,221	2021-02-02	2039-06-09	10,905,810	Can Cinbis
626	C00017297.WO01	TETS RECHARGED PATIENT ALERT SYSTEM FOR LVAD PATIENTS	Patent Cooperation Treaty	Converted	2018-02-21	2019-02-20	PCT/US2019/018676		2020-10-21		Can Cinbis
627	C00017297CN01	TETS RECHARGED PATIENT ALERT SYSTEM FOR LVAD PATIENTS	China	Published	2018-02-21	2019-02-20	201980014742.0				Can Cinbis
628	C00017297EP01	TETS RECHARGED PATIENT ALERT SYSTEM FOR LVAD PATIENTS	European Patent	Allowed	2018-02-21	2019-02-20	19709251.3				Can Cinbis
629	C00017423.US01	BLOOD PUMP WITH IMPELLER RINSE OPERATION	United States of America	Granted	2017-12-05	2018-11-26	16/199,684	2021-07-20	2039-03-15	11,065,434	Mark Egler Fernando Casas Carlos Reyes Jeffrey A Larose
630	C00017423.WO01	BLOOD PUMP WITH IMPELLER RINSE OPERATION	Patent Cooperation Treaty	Converted	2017-12-05	2018-11-26	PCT/US2018/062431		2020-08-05		Mark Egler Fernando Casas Carlos Reyes Jeffrey A Larose
631	C00017423CN01	BLOOD PUMP WITH IMPELLER RINSE OPERATION	China	Granted	2017-12-05	2018-11-26	201880078562.4	2023-12-01	2038-11-25	ZL201880078562.4	Mark Egler Fernando Casas Carlos Reyes Jeffrey A Larose
632	C00017423EP01	BLOOD PUMP WITH IMPELLER RINSE OPERATION	European Patent	Published	2017-12-05	2018-11-26	18816424.8				Mark Egler Fernando Casas Carlos Reyes Jeffrey A Larose
633	C00017423US01CON	BLOOD PUMP WITH IMPELLER RINSE OPERATION	United States of America	Allowed	2017-12-05	2021-06-24	17/356,704			11,969,588	Mark Egler Fernando Casas Carlos Reyes Jeffrey A Larose
634	C00017474.EP01	DETACHABLE PERCUTANEOUS CONNECTOR	European Patent	Converted	2016-06-13	2017-07-06	17733248.3	2021-04-07	2037-07-06	3468636	Michael Tajima
635	C00017474.WOU3	DETACHABLE PERCUTANEOUS CONNECTOR	Patent Cooperation Treaty	Converted	2016-06-13	2017-07-06	PCT/US2017/037168		2019-01-13		Michael Tajima
636	C00017517.WO01	RF POWER TRANSFER COIL FOR IMPLANTABLE VAD PUMPS	Patent Cooperation Treaty	Converted	2018-03-14	2019-03-07	PCT/US2019/021099		2020-11-14		Gonzalo Martinez David Peichel
637	C00017522.US01	Current-Speed Relationship for Instantaneous Suction Detection Algorithm in LVADs	United States of America	Granted	2018-05-17	2019-05-08	16/406,220	2022-02-01	2039-07-26	11,235,139	DAnne Kudlik
638	C00017522.WO01	Current-Speed Relationship for Instantaneous Suction Detection Algorithm in LVADs	Patent Cooperation Treaty	Converted	2018-05-17	2019-05-08	PCT/US2019/031253		2021-01-17		DAnne Kudlik
639	C00017522CN01	Current-Speed Relationship for Instantaneous Suction Detection Algorithm in LVADs	China	Published	2018-05-17	2019-05-08	201980026519.8				DAnne Kudlik
640	C00017522EP01	Current-Speed Relationship for Instantaneous Suction Detection Algorithm in LVADs	European Patent	Allowed	2018-05-17	2019-05-08	19725547.4				DAnne Kudlik

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
641	C00017522US01CON	Current-Speed Relationship for Instantaneous Suction Detection Algorithm in LVADs	United States of America	Published	2018-05-17	2022-01-31	17/649,483				DAnne Kudlik
642	C00017540.US01	AXIAL BLOOD PUMP WITH IMPELLER RINSE OPERATION	United States of America	Granted	2018-01-31	2019-01-29	16/260,648	2022-04-26	2039-08-03	11,311,711	Fernando Casas Carlos Reyes Justin Wolman-Miller Thomas Johnson
643	C00017540.WO01	AXIAL BLOOD PUMP WITH IMPELLER RINSE OPERATION	Patent Cooperation Treaty	Converted	2018-01-31	2019-01-29	PCT/US2019/015561		2020-09-30		Fernando Casas Carlos Reyes Justin Wolman-Miller Thomas Johnson
644	C00017540CN01	AXIAL BLOOD PUMP WITH IMPELLER RINSE OPERATION	China	Granted	2018-01-31	2019-01-29	201980010988.0	2023-12-12	2039-01-28	ZL201980010988.0	Fernando Casas Carlos Reyes Justin Wolman-Miller Thomas Johnson
645	C00017573.US01	Axial Pump Pressure Algorithm with Field Oriented Control	United States of America	Granted	2018-05-10	2019-05-07	16/405,483	2022-09-20	2039-08-17	11,446,481	Justin Wolman-Miller Fernando Casas Carlos Reyes Thomas Johnson
646	C00017573.WO01	Axial Pump Pressure Algorithm with Field Oriented Control	Patent Cooperation Treaty	Converted	2018-05-10	2019-05-07	PCT/US2019/031123		2021-01-10		Justin Wolman-Miller Fernando Casas Carlos Reyes Thomas Johnson
647	C00017573CN01	Axial Pump Pressure Algorithm with Field Oriented Control	China	Published	2018-05-10	2019-05-07	201980014995.8				Justin Wolman-Miller Fernando Casas Carlos Reyes Thomas Johnson
648	C00017573DE01	Axial Pump Pressure Algorithm with Field Oriented Control	Germany (Federal Republic of)	Granted	2018-05-10	2019-05-07	19725522.7	2024-02-21	2039-05-07	3790606	Justin Wolman-Miller Fernando Casas Carlos Reyes Thomas Johnson
649	C00017573EP01	Axial Pump Pressure Algorithm with Field Oriented Control	European Patent	Granted	2018-05-10	2019-05-07	19725522.7	2024-02-21	2039-05-07	3790606	Justin Wolman-Miller Fernando Casas Carlos Reyes Thomas Johnson
650	C00017842.EP01	DYNAMIC HQ FOR CLOSED LOOP CONTROL	European Patent	Converted	2017-10-13	2018-10-01	18792700.9	2022-09-14	2038-10-01	3694573	Carlos Reyes Fernando Casas
651	C00017842.US01	DYNAMIC HQ FOR CLOSED LOOP CONTROL	United States of America	Granted	2017-10-13	2018-10-01	16/148,312	2020-10-20	2039-03-06	10,806,840	Carlos Reyes Fernando Casas
652	C00017842.WO01	DYNAMIC HQ FOR CLOSED LOOP CONTROL	Patent Cooperation Treaty	Converted	2017-10-13	2018-10-01	PCT/US2018/053713		2020-06-13		Carlos Reyes Fernando Casas
653	C00017842US01DIV	DYNAMIC HQ FOR CLOSED LOOP CONTROL	United States of America	Granted	2017-10-13	2020-09-11	17/017,873	2022-07-05	2038-11-06	11,376,419	Carlos Reyes Fernando Casas

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
654	C00017884.US01	MULTI-INPUT SPEED RESPONSE ALGORITHM FOR A BLOOD PUMP	United States of America	Granted	2018-04-06	2019-03-20	16/359,501	2023-01-17	2040-01-29	11,554,260	Carlos Reyes Katherine Chorpenning Antonio Ferreira Neethu Lekshmi Vasudevan Jalaja Justin Wolman-Miller Fernando Casas
655	C00017884.WO01	MULTI-INPUT SPEED RESPONSE ALGORITHM FOR A BLOOD PUMP	Patent Cooperation Treaty	Converted	2018-04-06	2019-03-20	PCT/US2019/023181		2020-12-06		Carlos Reyes Katherine Chorpenning Antonio Ferreira Neethu Lekshmi Vasudevan Jalaja Justin Wolman-Miller Fernando Casas
656	C00017884CN01	MULTI-INPUT SPEED RESPONSE ALGORITHM FOR A BLOOD PUMP	China	Published	2018-04-06	2019-03-20	201980024810.1				Carlos Reyes Katherine Chorpenning Antonio Ferreira Neethu Lekshmi Vasudevan Jalaja Justin Wolman-Miller Fernando Casas
657	C00017884EP01	MULTI-INPUT SPEED RESPONSE ALGORITHM FOR A BLOOD PUMP	European Patent	Published	2018-04-06	2019-03-20	19715647.4				Carlos Reyes Katherine Chorpenning Antonio Ferreira Neethu Lekshmi Vasudevan Jalaja Justin Wolman-Miller Fernando Casas
658	C00017948.USU2	DETECTION OF PUMP THROMBOSIS	United States of America	Granted	2018-02-20	2018-05-02	15/969,030	2020-09-08	2038-12-20	10,765,790	Aleksandre T Sambelashvili David Steinhaus David Anderson James K Carney Narendra Simha
659	C00017948.WO01	DETECTION OF PUMP THROMBOSIS	Patent Cooperation Treaty	Converted	2018-02-20	2019-02-20	PCT/US2019/018686		2020-10-20		Aleksandre T Sambelashvili David Anderson James K Carney Narendra Simha David Steinhaus
660	C00017948CN01	DETECTION OF PUMP THROMBOSIS	China	Allowed	2018-02-20	2019-02-20	201980014253.5				Aleksandre T Sambelashvili David Anderson James K Carney Narendra Simha David Steinhaus
661	C00017948DE01	DETECTION OF PUMP THROMBOSIS	Germany (Federal Republic of)	Granted	2018-02-20	2019-02-20	19708760.4	2022-07-20	2039-02-20	60 2019 017 204.4	Aleksandre T Sambelashvili David Anderson James K Carney Narendra Simha David Steinhaus

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
662	C00017948EP01	DETECTION OF PUMP THROMBOSIS	European Patent	Converted	2018-02-20	2019-02-20	19708760.4	2022-07-20	2039-02-20	3755390	Aleksandre T Sambelashvili David Anderson James K Carney Narendra Simha David Steinhaus
663	C00017948US01CON	DETECTION OF PUMP THROMBOSIS	United States of America	Granted	2018-02-20	2020-08-31	17/007,342	2023-08-15	2039-08-20	11,724,028	Aleksandre T Sambelashvili David Anderson James K Carney David Steinhaus Narendra Simha
664	C00017988DE01	BODY POSITION AND ACTIVITY BASED FLOW CONTROL FOR VENTRICULAR ASSIST DEVICE (VAD) WITH FULLY IMPLANTABLE CONTROLLER	Germany (Federal Republic of)	Published	2020-05-26	2021-05-24	11 2021 002 996.7				Yong Cho Michael Hess Michael Eggen Michael Brown Michael Reinert
665	C00017988US02	BODY POSITION AND ACTIVITY BASED FLOW CONTROL FOR VENTRICULAR ASSIST DEVICE (VAD) WITH FULLY IMPLANTABLE CONTROLLER	United States of America	Allowed	2020-05-26	2021-05-20	17/325,328			11,931,561	Yong Cho Michael Hess Michael Eggen Michael Brown Michael Reinert
666	C00017988WO01	BODY POSITION AND ACTIVITY BASED FLOW CONTROL FOR VENTRICULAR ASSIST DEVICE (VAD) WITH FULLY IMPLANTABLE CONTROLLER	Patent Cooperation Treaty	Converted	2020-05-26	2021-05-24	PCT/US2021/033810		2023-01-26		Yong Cho Michael Hess Michael Eggen Michael Brown Michael Reinert
667	C00018043US02	MAGNETIC ALIGNMENT OF TRANSCUTANEOUS ENERGY TRANSFER COILS	United States of America	Granted	2020-08-12	2021-07-07	17/369,259	2023-03-28	2041-07-07	11,616,397	Eric Schilling
668	C00018092.WO01	A SYSTEM FOR AUTOMATED ANALYSIS OF MCS LOG FILES	Patent Cooperation Treaty	Converted	2018-02-01	2019-01-31	PCT/US2019/016055		2020-10-01		Michael Brown Carlos Reyes Daniel Tamez Neil Voskoboynikov
669	C00018092CN01	A SYSTEM FOR AUTOMATED ANALYSIS OF MCS LOG FILES	China	Published	2018-02-01	2019-01-31	201980011283.0				Michael Brown Carlos Reyes Daniel Tamez Neil Voskoboynikov
670	C00018135.US01	Early warning of LVAD thrombus formation	United States of America	Granted	2018-01-26	2019-01-16	16/248,888	2021-10-26	2039-05-12	11,154,702	Abhijit Kadrolkar Robert Stadler Michael Brown
671	C00018135.WO01	Early warning of LVAD thrombus formation	Patent Cooperation Treaty	Converted	2018-01-26	2019-01-16	PCT/US2019/013731		2020-09-26		Abhijit Kadrolkar Robert Stadler Michael Brown
672	C00018135CN01	Early warning of LVAD thrombus formation	China	Published	2018-01-26	2019-01-16	201980010114.5				Abhijit Kadrolkar Robert Stadler Michael Brown

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
673	C00018135US01CON	Early warning of LVAD thrombus formation	United States of America	Published	2018-01-26	2021-10-15	17/502,117				Abhijit Kadrolkar Robert Stadler Michael Brown
674	C00018237US01	SEALED ACOUSTIC SPEAKER AND MEDICAL DEVICE INCLUDING SAME	United States of America	Granted	2018-12-20	2019-12-19	16/721,003	2021-10-26	2039-12-19	11,159,864	Nathan L Olson Joseph Ippolito Matthew Saterbak Luke Thomas Babler Thai Nguyen
675	C00018237US02CON	SEALED ACOUSTIC SPEAKER AND MEDICAL DEVICE INCLUDING SAME	United States of America	Granted	2018-12-20	2021-09-24	17/483,996	2024-01-02	2039-12-19	11,863,923	Nathan L Olson Joseph Ippolito Matthew Saterbak Luke Thomas Babler Thai Nguyen
676	C00018240DE01	THERMAL STIMULATION AND SUBSEQUENT COOLING FOR FULLY IMPLANTABLE LVAD CONTROLLER	Germany (Federal Republic of)	Published	2020-07-22	2021-06-28	11 2021 003 905.9				Michael Eggen Yong Cho Avram Scheiner Ramesh Raghupathy Thomas Radtke
677	C00018240US01	THERMAL STIMULATION AND SUBSEQUENT COOLING FOR FULLY IMPLANTABLE LVAD CONTROLLER	United States of America	Published		2020-07-22	16/935,433				Michael Eggen Yong Cho Avram Scheiner Ramesh Raghupathy Thomas Radtke
678	C00018240WO01	THERMAL STIMULATION AND SUBSEQUENT COOLING FOR FULLY IMPLANTABLE LVAD CONTROLLER	Patent Cooperation Treaty	Converted	2020-07-22	2021-06-28	PCT/US2021/039363		2023-03-22		Michael Eggen Yong Cho Avram Scheiner Ramesh Raghupathy Thomas Radtke
679	C00018346.US02	MCS AE (Adverse Event) Risk Score	United States of America	Published	2018-10-16	2019-10-07	16/594,552				Michael Brown Veronica Ramos Neil Voskoboynikov
680	C00018346.WO01	MCS ADVERSE EVENT RISK SCORE	Patent Cooperation Treaty	Converted	2018-10-16	2019-10-07	PCT/US2019/054960		2021-06-16		Michael Brown Veronica Ramos Neil Voskoboynikov
681	C00018346CN01	MCS AE (Adverse Event) Risk Score	China	Published	2018-10-16	2019-10-07	201980067804.4				Michael Brown Veronica Ramos Neil Voskoboynikov
682	C00018454CN01	IMPLANTABLE MEDICAL DEVICE INCLUDING CABLE FASTENER	China	Published	2019-12-04	2020-12-01	202080079152.9				Kevin Seifert Pankti N Shah Michael Eggen Yong Cho David Peichel Thomas Radtke Jason Hamack

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
683	C00018454US02	IMPLANTABLE MEDICAL DEVICE INCLUDING CABLE FASTENER	United States of America	Published	2019-12-04	2020-11-30	17/107,408				Kevin Seifert Yong Cho Michael Eggen David Peichel Thomas Radtke Pankti N Shah Jason Hamack
684	C00018454WO01	IMPLANTABLE MEDICAL DEVICE INCLUDING CABLE FASTENER	Patent Cooperation Treaty	Converted	2019-12-04	2020-12-01	PCT/US2020/062666		2022-08-04		Kevin Seifert Pankti N Shah Michael Eggen Yong Cho David Peichel Thomas Radtke Jason Hamack
685	C00019061DE01	VENTRICULAR ASSIST SYSTEM AND METHOD	Germany (Federal Republic of)	Application	2020-04-30	2021-04-26	11 2021 002 530.9				Alan Cheng Jian Cao Hai Huang
686	C00019061US02	VENTRICULAR ASSIST SYSTEM AND METHOD	United States of America	Granted	2020-04-30	2021-03-31	17/219,510	2023-01-24	2041-04-09	11,559,690	Alan Cheng Jian Cao Hai Huang
687	C00019061WO01	VENTRICULAR ASSIST SYSTEM AND METHOD	Patent Cooperation Treaty	Converted	2020-04-30	2021-04-26	PCT/US2021/029052		2022-12-30		Alan Cheng Jian Cao Hai Huang
688	C00019130US02	TRANSCUTANEOUS ENERGY TRANSFER SYSTEM INCLUDING ALARM	United States of America	Granted	2019-12-20	2020-11-30	17/107,419	2024-01-30	2042-04-05	11,883,675	Michael Hess Michael Reinert
689	C00019152CN01	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	China	Published	2019-02-28	2020-02-10	202080017422.3				Carlos Reyes Justin Wolman-Miller
690	C00019152EP01	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	European Patent	Published	2019-02-28	2020-02-10	20709969.8				Carlos Reyes Justin Wolman-Miller
691	C00019152JP01	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	Japan	Application	2019-02-28	2020-02-10	2021-532906				Carlos Reyes Justin Wolman-Miller
692	C00019152KR01	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	Korea, Republic of (KR)	Published	2019-02-28	2020-02-10	10-2021-7019816				Carlos Reyes Justin Wolman-Miller
693	C00019152US02	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	United States of America	Granted	2019-02-28	2020-01-31	16/778,658	2022-05-03	2040-08-02	11,318,295	Carlos Reyes Justin Wolman-Miller
694	C00019152WO01	HVAD Rinse via a Non-Uniform Thrust Bearing Gap	Patent Cooperation Treaty	Converted	2019-02-28	2020-02-10	PCT/US2020/017461		2021-10-28		Carlos Reyes Justin Wolman-Miller
695	C00019180US02	LVAD FIXATION AND INFECTION MANAGEMENT	United States of America	Published	2020-03-19	2021-02-17	17/177,519				Kevin Seifert Satish Pulapura Melissa Christie Rebecca Temple Michael Eggen
696	C00019373CN01	Shield Optimization for Maximizing Heat Dissipation at the Device Tissue Interface and Improving Fixation	China	Published	2019-06-07	2020-05-29	202080043246.0				Michael Eggen Yong Cho DAnne Kudlik

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3	Patent Reference	Patent Application Title	Country	Status	Priority Date	Filed Date	Application Number	Grant Date	Expiry Date	Patent No.	Inventor(s)
697	C00019373US02	Shield Optimization for Maximizing Heat Dissipation at the Device Tissue Interface and Improving Fixation	United States of America	Published	2019-06-07	2020-05-28	16/885,363				Michael Eggen Yong Cho DAnne Kudlik
698	C00019373WO01	Shield Optimization for Maximizing Heat Dissipation at the Device Tissue Interface and Improving Fixation	Patent Cooperation Treaty	Converted	2019-06-07	2020-05-29	PCT/US2020/035047		2022-02-07		Michael Eggen Yong Cho DAnne Kudlik
699	C00019453.US01	Cannula Delivery Catheter and Procedure Method	United States of America	Granted		2019-04-04	16/375,486	2023-01-24	2039-08-28	11,559,669	Andrea J Asleson Michael Campbell Teresa Whitman Keith D Anderson Bridget Cavanagh
700	C00019453CN01	Cannula Delivery Catheter and Procedure Method	China	Published	2019-04-04	2020-02-24	202080024269.7				Andrea J Asleson Michael Campbell Teresa Whitman Keith D Anderson Bridget Cavanagh
701	C00019453WO01	Cannula Delivery Catheter and Procedure Method	Patent Cooperation Treaty	Converted	2019-04-04	2020-02-24	PCT/US2020/019487		2021-12-04		Andrea J Asleson Michael Campbell Teresa Whitman Keith D Anderson Bridget Cavanagh
702	C00019653US02	Use of graphite to spread heat inside device	United States of America	Published	2020-04-21	2021-03-22	17/208,114				Thomas Fick Harold Dyalsingh Brian Kuhnley Jeffrey Swanson Ramesh Raghupathy Amir Zamiri Thomas Radtke Lisa Dalluge
703	C00019871.US02	METHOD OF ESTIMATING HEART RATE AND DETECTING TACHYARRHYTHMIA	United States of America	Granted	2018-11-15	2019-11-12	16/680,758	2022-07-05	2039-12-29	11,376,418	Robert Stadler
704	C00019871.WO01	METHOD OF ESTIMATING HEART RATE AND DETECTING TACHYARRHYTHMIA	Patent Cooperation Treaty	Converted	2018-11-15	2019-11-12	PCT/US2019/060829		2021-07-15		Robert Stadler
705	C00019871CN01	METHOD OF ESTIMATING HEART RATE AND DETECTING TACHYARRHYTHMIA	China	Published	2018-11-15	2019-11-12	201980075193.8				Robert Stadler
706	C00019907US02	TETS Coil Alignment Conditions Algorithm	United States of America	Published	2020-03-12	2021-02-01	17/163,740				Eric Schilling John Rudser David Peichel Brian Kuhnley