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

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Dieterle
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

Edwards v. Aortic Innovations
U.S. Patent 11,491,033
Edwards Ex. 1002

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	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Dieterle
	Attorney Docket Number	426/2/25 UTIL

	1	Galla Report, Aortic Innovations v. Edwards Lifesciences, 1:21-cv-01377-JPM, October 3, 2022
	2	Brookstein Report, Aortic Innovations v. Edwards Lifesciences, 1:21-cv-01377-JPM, October 3, 2022
	3	Stowell, Joshua, Preliminary Claim Construction Positions, Aortic Innovations v. Edwards Lifesciences, 1:21-cv-01377-JPM, September 19, 2022
	4	Brecker, Stephen, Deposition Transcript dated August 30, 2022
	5	Summers, Craig, Patent Trial and Appeal Board, PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE for US Patent No. 10,966,846 dated October 3, 2022
	6	Summers, Craig, Patent Trial and Appeal Board, PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE for US Patent No. 10,792,172 dated October 3, 2022
	7	Summers, Craig, Patent Trial and Appeal Board, PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE for US Patent No. 10,881,538 dated October 3, 2022
	8	Summers, Craig, Patent Trial and Appeal Board, PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE for US Patent No. 10,857,011 dated October 3, 2022

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

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	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
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	Examiner Name	Dieterle
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-10-16
Name/Print	Justin R. Nifong	Registration Number	59389

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

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	46826330
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	16-OCT-2022
Filing Date:	12-APR-2022
Time Stamp:	09:33:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Binder2-printed.pdf	12319977 c9db93e15945b5d09dc7b92e777f5b813f736517	no	675

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	10-16-2022-aortic-25-IDS.pdf	1034635 d7db12b7a655abcc0dfe301e3bab45d16c327d40	no	4

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Information:

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 10/14/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER
DIETERLE, JENNIFER M

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
10/14/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

Corrected ***Notice of Allowability***	**Application No.** 17/719,160	**Applicant(s)** Shahriari, Ali	
	Examiner JENNIFER M DIETERLE	**Art Unit** 3774	**AIA (FITF) Status** No

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

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

1. ☑ This communication is responsive to 8/31/22 IDS.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are 3-8 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

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

   Certified copies:

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

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

   * Certified copies not received: _____ .

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

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

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

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

Attachment(s)

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

/Jennifer Dieterle/
Supervisory Patent Examiner, Art Unit 3774

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

PTO/SB/08a (02-18)
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Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JD/

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	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	1	FLANAGAN, Beverly Meindl, Office Action for 90/015,039 dated 8/29/2022

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EXAMINER SIGNATURE

Examiner Signature	/Jennifer Dieterle/ (10/12/2022)	Date Considered	

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

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Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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OR

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See attached certification statement.

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

A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-08-31
Name/Print	Justin R. Nifong	Registration Number	59389

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 09/26/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER	
DIETERLE, JENNIFER M	

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
09/26/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

Corrected ***Notice of Allowability***	**Application No.** 17/719,160	**Applicant(s)** Shahriari, Ali	
	Examiner JENNIFER M DIETERLE	**Art Unit** 3774	**AIA (FITF) Status** No

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

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

1. ☑ This communication is responsive to 9/8/22.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are 3-8 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

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

   Certified copies:

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

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

   * Certified copies not received: _____ .

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

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

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

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

Attachment(s)

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

/Jennifer Dieterle/
Supervisory Patent Examiner, Art Unit 3774

DETAILED ACTION

Allowable Subject Matter

Claims 3-8 are allowed.

Applicants filed an IDS on September 8. 2022, after the notice of allowance mailed on September 1, 2022. The allowability of claims 3-8 is confirmed. Nothing cited on the newly presented IDS altered the previous determination of the allowable subject matter.

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

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER M DIETERLE whose telephone number is (571)270-7872. The examiner can normally be reached M-Th 9:30-5:30 EST.

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

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer Dieterle/
Supervisory Patent Examiner, Art Unit 3774

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

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

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FOREIGN PATENT DOCUMENTS Remove

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

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

NON-PATENT LITERATURE DOCUMENTS Remove

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JD/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	1	NEW, John, IPR 2022-00556 documents, dated September 8, 2022
	2	NEW, John, IPR 2022-00549 documents, dated September 6, 2022

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

EXAMINER SIGNATURE

Examiner Signature	/Jennifer Dieterle/ (09/20/2022)	Date Considered	

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

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JD/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-09-08
Name/Print	Justin R. Nifong	Registration Number	59389

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JD/

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JD/

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
17719160	12-Apr-2022	Ali Shahriari	426/2/25 UTIL	1031

TITLE OF INVENTION :

TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Small	Utility under 35 USC 111(a)	3774	001200	PAUL PREBILIC

Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
$600	$0	$600	01-Dec-2022	$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
175373 Aortic Innovations, LLC 4917 Waters Edge Drive, Suite 275 Raleigh NC 27606 UNITED STATES 919-348-2194 usptomail@nkpatentlaw.com	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☐ Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status

Change in Entity Status

○ Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.
Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.

◉ Applicant asserting small entity status. See 37 CFR 1.27.
Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

○ Applicant changing to regular undiscounted fee status.
Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

☒ Issue Fee

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ Publication Fee

☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

☐ Advance Order - # of copies _____

☒ If **in addition to** the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number 506191 . The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

1. NK Patent Law
2.
3.

5.Assignee Name(s) and Residence Data To Be Printed

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

Name	City	State	Country	Category
Aortic Innovations, LLC	Hillsboro Beach	FLORIDA	UNITED STATES	other

6.Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/Justin R. Nifong/	**Date**	09-11-2022
Name	Justin Robert Nifong	**Registration Number**	59389

Electronic Patent Application Fee Transmittal

Application Number:	17719160
Filing Date:	12-Apr-2022
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Filer:	Justin Robert Nifong
Attorney Docket Number:	426/2/25 UTIL

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPL ISSUE FEE	2501	1	600	600
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**600**

Electronic Acknowledgement Receipt

EFS ID:	46591262
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	11-SEP-2022
Filing Date:	12-APR-2022
Time Stamp:	08:53:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$600
RAM confirmation Number	E20229A953194104
Deposit Account	506191
Authorized User	Justin Nifong
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.20 (Post Issuance fees) 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Web85b.pdf	62747 8e7e6e207d06da9afee43b691efa2b64b755228a	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	40302 2c5bb3a61c26f1268264dbc2e3a2933899075c40	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	103049		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

COMMUNICATION TO THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	1031
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	Paul Prebilic		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

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

COMMENTS ACCOMPANYING SUBMISSION OF INFORMATION DISCLOSURE STATEMENT

REMARKS

Applicant has submitted an Information Disclosure Statement on September 8, 2022. The Information Disclosure Statement included two institution decisions from the PTAB, one of institution of US Patent No. 10,987,236 and one of non-institution of US Patent No. 11,129,735. The '236 and '735 Patents each share a common specification with this application.

Claims 3 and 4 of the '236 Patent have some overlap with the base claims presented herein, namely, that claims 3 and 4 of the '236 Patent generally recite openings in the fiber seal. The Patent Owner Preliminary response did not address these claims, and instead focused on only independent claim 1 in view of the *SAS* decision. The PTAB acknowledged that "*Petitioner contends that a person of ordinary skill in the art would have understood that small openings inherently exist between the radially extending fibers that are formed by spacing between the adjacent fibers. Id. (citing Ex. 1007, Fig. 1; Ex. 1003 ¶ 152). According to Petitioner, Figure 1 of Walther shows that the fibers of the outer cloth are dense enough to prevent blood from flowing through the fibers, but still loose enough to create small gaps. Id. (citing Ex. 1003 ¶ 153). Petitioner argues that these small gaps define a plurality of "opening[s] extending through a thickness" of the radially extending fibers, as recited in claim 3. Id.*"

However, Patent Owner did not contest claims 3 and 4 in that stage of the proceeding based solely on the *SAS* decision impacting all claims in an IPR. To the extent that the PTAB separately analyzed claims 3 and 4, such analysis appears to have assumed that the inherent spacing between fibers in Walther satisfied the "openings" limitations in the claims. These limitations have a parallel to the claims presented herein as the claims recite the similar term "spaces."

Patent claim construction must not render significant portions of the claim language superfluous. *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1378 (Fed. Cir. 2009) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so."). The PTAB, by stating that "small openings inherently exist between the radially extending fibers," read out of the claim the limitation of "spaces" found in claims 3 and 4 in the '236 Patent. This was in error.

The specification illustrates spacing between fibers that are an intentionally placed spacing, i.e., not just the spacing that may be inherent between radially extending fibers such as those that appear to be found in the Walther reference. Applicant notes that the claims recite spacings extending through a thickness of the sealing assembly that allow fluid to pass therethrough when the prosthetic heart valve assembly is in an undeployed state. Annotated images are shown below:

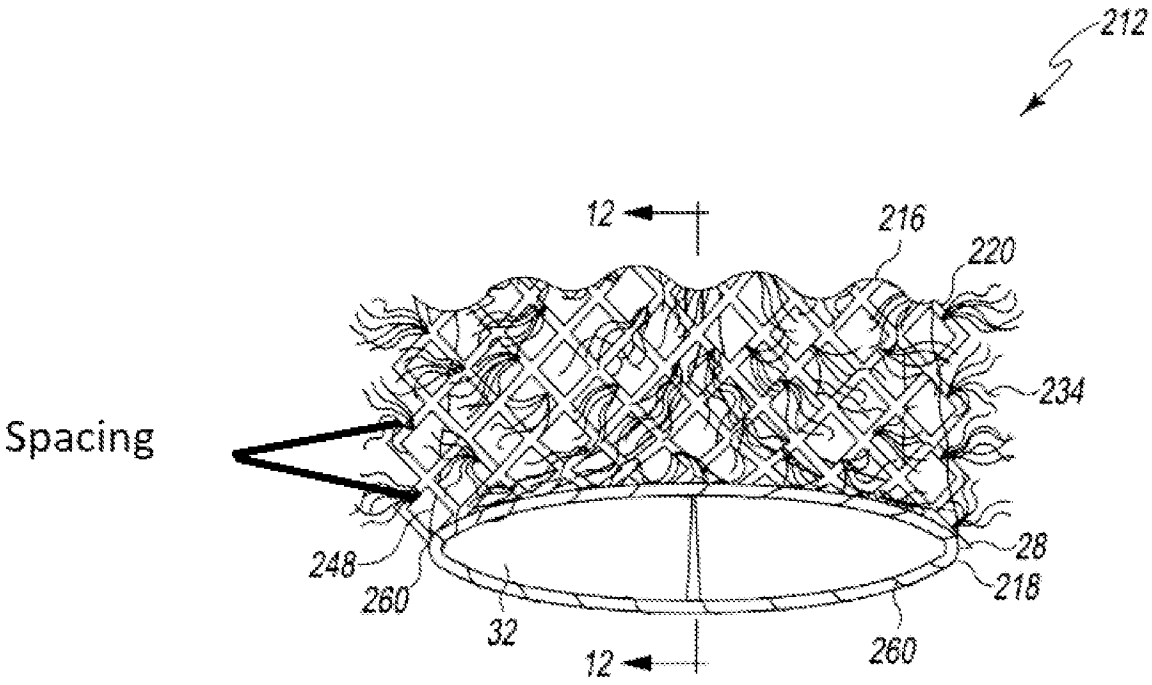
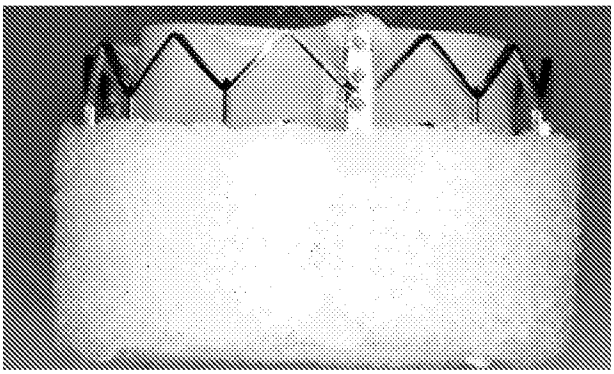


Fig. 11

The benefit to this design is that the lesser density construction allows for a smaller crimp profile. These claim limitations are clearly not shown in the Walther reference, an image of which is reproduced below:



Not does not appear that any such spacings are visible or disclosed in the Walther reference. In operation of Applicant's claimed invention, the compression of the fibers into the spacings reduces the claimed spacings to create the seal, while maintaining a small crimp profile. Critically, the compression of the fibers into the spaces in operation is the mechanism by which the seal is created. Without this in situ compression, the spaces extending through the thickness of the fibers may not create a sealing assembly. This is not shown in the references of record.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any otherwise unpaid fees associated with the filing of this correspondence to Deposit Account No. **50-6191**.

Respectfully submitted,

Date: September 11, 2022

/Justin R. Nifong/
Justin R. Nifong
Reg. No. 59,389

NK Patent Law
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606
Telephone: (919) 348-2194
Facsimile: (919) 882-8195

Customer No. 175373

Electronic Acknowledgement Receipt

EFS ID:	46591261
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	11-SEP-2022
Filing Date:	12-APR-2022
Time Stamp:	08:49:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	426-2-25-UTIL-IDS-comments-9-11.pdf	279860 117f6168695a52d381488bcfca305ee23df23fd0	no	4

Warnings:

Information:	
Total Files Size (in bytes):	279860

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

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

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

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

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

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

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

NON-PATENT LITERATURE DOCUMENTS Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	1	NEW, John, IPR 2022-00556 documents, dated September 8, 2022
	2	NEW, John, IPR 2022-00549 documents, dated September 6, 2022

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
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	Examiner Name	Shipmon
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CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-09-08
Name/Print	Justin R. Nifong	Registration Number	59389

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

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

Electronic Patent Application Fee Transmittal

Application Number:	17719160
Filing Date:	12-Apr-2022
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Filer:	Justin Robert Nifong
Attorney Docket Number:	426/2/25 UTIL

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	130	130
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	46577649
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	08-SEP-2022
Filing Date:	12-APR-2022
Time Stamp:	15:09:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$130
RAM confirmation Number	E202298F11024967
Deposit Account	506191
Authorized User	Justin Nifong

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	236-institution.pdf	765807 30e7c446b9f9830d6d45ebecd3d033c5c486ee1e	no	64
Warnings:					
Information:					
2	Non Patent Literature	735-institution.pdf	608007 093f32529b09e3ccd2625d6ed0faccea04ed8002	no	32
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	IDS-426-2-25-dtd-9-8-2022.pdf	1034277 7121bbb9b516e405be00c485571de5bac9b42e54	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
4	Fee Worksheet (SB06)	fee-info.pdf	38138 5c6bb536515576906e5ee1cbfbce9babd6dd5bd7	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2446229		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

175373 7590 09/01/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER
PREBILIC, PAUL B

ART UNIT	PAPER NUMBER
3774	

DATE MAILED: 09/01/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

TITLE OF INVENTION: TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	12/01/2022

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

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

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

175373 7590 09/01/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

TITLE OF INVENTION: TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	12/01/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
PREBILIC, PAUL B	3774	623-001200

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

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

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

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

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

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 09/01/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER	
PREBILIC, PAUL B	
ART UNIT	PAPER NUMBER
3774	

DATE MAILED: 09/01/2022

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

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

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

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

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

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

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

Privacy Act Statement

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

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

Notice of Allowability	Application No. 17/719,160	Applicant(s) Shahriari, Ali	
	Examiner PAUL PREBILIC	Art Unit 3774	AIA (FITF) Status No

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

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

1. ☑ This communication is responsive to August 23, 2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are 3-8 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

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

   Certified copies:

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

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

   * Certified copies not received: _____ .

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

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

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

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

Attachment(s)

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

/PAUL B PREBILIC/
Primary Examiner, Art Unit 3774

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	**Art Unit**
	PAUL PREBILIC	3774

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61F 2/856,07,2418,82,962,24,86,89,90; 2002/061,067; 2210/00,0014,0057; 2220/0008,0016,0025,0058,0075; 2230/001,0034,0067; 2250/0048,0069	07/13/2022	T.S.

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

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

Search Notes		
Search Notes	**Date**	**Examiner**
Assignee/Inventor Search	07/13/2022	T.S,
EAST Search	07/13/2022	T.S.
Performed text searches via SEARCH.	08/16/2022	/PBP/
Updated CPC searches via SEARCH.	08/16/2022	/PBP/
Updated CPC searches via SEARCH.	08/25/2022	/PBP/
Performed claims' text search via SEARCH.	08/25/2022	/PBP/

/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	Art Unit
	PAUL PREBILIC	3774

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
A61F	2/856,07,2418,82,962,24,86,89,90; 2002/061, 067; 2210/00,0014,0057; 2220/ 0008,0016,0025,0058,0075; 2230/001,0034,0067; 2250/0048,0069.	08/25/2022	/PBP/

/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	**Art Unit**
	PAUL PREBILIC	3774

CPC						
Symbol					**Type**	**Version**
A61F	/	2	/	856	F	2013-01-01
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A61F	/	2	/	2418	I	2013-01-01
A61F	/	2	/	962	I	2013-01-01
A61F	/	2	/	82	I	2013-01-01
A61F	/	2002	/	061	A	2013-01-01
A61F	/	2220	/	0025	A	2013-01-01
A61F	/	2230	/	0067	A	2013-01-01
A61F	/	2002	/	067	A	2013-01-01
A61F	/	2220	/	0008	A	2013-01-01
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A61F	/	2230	/	001	A	2013-01-01
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A61F	/	2	/	86	A	2013-01-01
A61F	/	2250	/	0069	A	2013-01-01
A61F	/	2210	/	0014	A	2013-01-01
A61F	/	2210	/	0057	A	2013-01-01
A61F	/	2210	/	00	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	6	
/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	25 August 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	9 + 13

U.S. Patent and Trademark Office — Part of Paper No.: 20220825

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	**Art Unit**
	PAUL PREBILIC	3774

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A61F	/	2	/	856
A61F	/	2	/	07
A61F	/	2	/	24
A61F	/	2	/	82

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	6	
/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	25 August 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	9 + 13

U.S. Patent and Trademark Office — Part of Paper No.: 20220825

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	**Art Unit**
	PAUL PREBILIC	3774

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	3														
2	4														
3	5														
4	6														
5	7														
6	8														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	6	
/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	25 August 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	9 + 13

U.S. Patent and Trademark Office

Part of Paper No.: 20220825

Entered
/PBP/
Aug. 25, 2022

COMMUNICATION TO THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	1031
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	Prebilic		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: DEVICE FOR AORTIC REPAIR AND METHOD OF USING THE SAME

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

RESPONSE TO FINAL OFFICE ACTION

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 3 of this paper.

Remarks begin on page 5 of this paper.

Bibliographic Data

Application No: 17/719,160

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /PAUL B PREBILIC/ Examiner's Signature | Initials

Title: TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
04/12/2022	623	3774	426/2/25 UTIL
RULE			

APPLICANTS

Aortic Innovations, LLC, Hillsboro Beach, FL,

INVENTORS

Ali Shahriari, Hillsboro Beach, FL, UNITED STATES

CONTINUING DATA

This application is a CON of 17327673 05/22/2021 PAT 11337834

17327673 is a CON of 17213251 03/26/2021

17213251 is a CON of 17096253 11/12/2020 PAT 10966846

17096253 is a CON of 17060557 10/01/2020 PAT 10888441

17060557 is a CON of 16910189 06/24/2020 PAT 10857011

16910189 is a CON of 16808137 03/03/2020 PAT 10792172

16808137 is a CON of 16736879 01/08/2020 PAT 10842655

16736879 is a CON of 16042286 07/23/2018 PAT 10555823

16042286 is a CON of 14614628 02/05/2015 PAT 10028848

14614628 is a CON of 14569306 12/12/2014 PAT 9339399

14569306 is a DIV of 13706896 12/06/2012 PAT 8940040

13706896 has PRO of 61723446 11/07/2012

13706896 has PRO of 61567458 12/06/2011

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/18/2022

** SMALL ENTITY **

STATE OR COUNTRY

UNITED STATES

ADDRESS

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606
UNITED STATES

FILING FEE RECEIVED

$830

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	0	17/719610	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:02 AM
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L32	19517	A61F2220/0008.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L33	24597	A61F2220/0016.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/08/16 04:10 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L34	48022	A61F2220/0025.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L35	13535	A61F2220/0058.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L36	28138	A61F2220/0075.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2022/08/16 04:10 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L37	5821	A61F2230/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L38	4693	A61F2230/0034.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L39	22034	A61F2230/0067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L40	2659	A61F2250/0048.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/08/16 04:11 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L41	7511	A61F2250/0069.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L42	170	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220713"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:19 PM
L43	7929	(heart AND valve AND (frame OR stent OR scaffold$3) AND cells AND expand$4 AND leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/08/16 04:51 PM

			IBM_TDB)				
L44	763	(heart SAME valve SAME (frame OR stent OR scaffold$3) SAME cells SAME expand$4 SAME leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:52 PM
L45	0	17/719610	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:02 AM
L46	63	13/706896	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:03 AM
L47	31	13/706896	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L48	1	13/706896.app.	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L49	30	("20020052649" OR "20020151958" OR "20030204249" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 11:50 AM

		"20030236567" OR "20040082989" OR "20040256759" OR "20060195183" OR "20080262593" OR "20080275540" OR "20100298927" OR "20110022157" OR "20110098802" OR "20110218619" OR "3725961" OR "5665117" OR "6110198" OR "6221102" OR "6547820" OR "6663667" OR "6729356" OR "6821297" OR "6918926" OR "7510575" OR "7524331" OR "7585321" OR "7921678" OR "7993394" OR "8408214" OR "9039757" OR "9393110").pn.					
L50	1	("10792172").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:18 PM
L51	1	("10966846").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:24 PM
L52	1	("11129735").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:32 PM
L53	1	("10987236").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:34 PM
L54	1	("10857011").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:38 PM
L55	1	("10881538").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:01 PM
L56	1	("10888441").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:02 PM
L57	1	("11026817").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:03 PM
L58	1	("11045335").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:05 PM
L59	9	6 7 8 9 10 11 12 13 14	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:24 PM
L60	433600	15 arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L61	2	15 AND arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L62	8742	A61F2/856.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/08/16 04:08 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L63	42045	A61F2/07.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L64	29978	A61F2/2418.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L65	29295	A61F2/82.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/08/16 04:08 PM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L66	4385	A61F2/962.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L67	6435	A61F2/24.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L68	12505	A61F2/86.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L69	17838	A61F2/89.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/08/16 04:09 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L70	30379	A61F2/90.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L71	9061	A61F2002/061.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L72	7435	A61F2002/067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/08/16 04:09 PM

			JPO; DERWENT; IBM_TDB)				
L73	1420	A61F2210/00.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L74	20938	A61F2210/0014.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L75	2937	A61F2210/0057.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L76	19517	A61F2220/0008.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/08/16 04:10 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L77	24597	A61F2220/0016.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L78	48022	A61F2220/0025.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L79	13535	A61F2220/0058.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM

L80	28138	A61F2220/0075.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L81	5821	A61F2230/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L82	4693	A61F2230/0034.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L83	22034	A61F2230/0067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/08/16 04:10 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L84	2659	A61F2250/0048.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L85	7511	A61F2250/0069.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L86	170	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220713"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:19 PM
L87	7929	(heart AND valve AND (frame OR stent OR	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/08/16 04:51 PM

		scaffold$3) AND cells AND expand$4 AND leaflet AND polymer$3 AND seal$4)	AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L88	763	(heart SAME valve SAME (frame OR stent OR scaffold$3) SAME cells SAME expand$4 SAME leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:52 PM
L89	4	wo-2006124649$.did.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 06:30 PM
L90	1	"20020052649".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:34 PM
L91	1	"5665117".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:34 PM
L92	1	"6110198".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:34 PM
L93	1	"6663667".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:35 PM
L94	1	"8408214".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:35 PM

L95	1	"7585321".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:35 PM
L96	30	90 91 92 93 49 95	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:36 PM
L97	6	90 91 92 93 94 95	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 06:36 PM
L98	29	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220816"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/25 10:22 AM
L99	2	(valve AND seal$3 AND cells! AND (frame AND scaffold$4 AND stent) AND leaflet AND polymer$ AND (heart OR vein OR aorta OR aortic OR artery OR venous)).clm.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/25 10:30 AM
L100	37	((valve AND seal$3 AND cells! AND (frame OR scaffold$4 OR stent) AND leaflet AND polymer$ AND (heart OR vein OR aorta OR aortic OR artery OR venous)).clm.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/25 12:26 PM

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	(valve AND seal$3 AND cells! AND (frame AND scaffold$4 AND stent) AND leaflet AND polymer$ AND (heart OR vein OR aorta OR aortic OR artery OR venous)).clm.	(US-PGPUB)	OR	ON	ON	2022/08/25 10:31 AM
N2	6	((valve AND seal$3 AND cells! AND (frame OR scaffold$4 OR stent) AND leaflet AND polymer$ AND (heart OR vein OR aorta OR aortic OR artery OR venous)).clm.)	(US-PGPUB)	OR	ON	ON	2022/08/25 12:26 PM

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	1	FLANAGAN, Beverly Meindl, Office Action for 90/015,039 dated 8/29/2022

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-08-31
Name/Print	Justin R. Nifong	Registration Number	59389

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

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

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

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

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

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

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

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

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

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	46529131
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	31-AUG-2022
Filing Date:	12-APR-2022
Time Stamp:	17:24:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS-426-2-25-dtd-8-31-2022.pdf	1034344 5fdade6669e4cebbe848158e69411be5506c6b66	no	4

Warnings:

Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Non Patent Literature	90015039-oa.pdf	1393375 3e812fcaeb3e25a845dc3b020e838df582ea9d73	no	23
Warnings:					
Information:					
			Total Files Size (in bytes):	2427719	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

COMMUNICATION TO THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	1031
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	Prebilic		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: DEVICE FOR AORTIC REPAIR AND METHOD OF USING THE SAME

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

RESPONSE TO FINAL OFFICE ACTION

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 3 of this paper.

Remarks begin on page 5 of this paper.

Amendments to the Specification:

Please amend paragraph [0084] of the specification as follows. The amendment is supported by the drawings as filed and does not add any new matter:

[0084] In the illustrative embodiment, collagen fibers **234** are attached to the proximal section **220** to aid in preventing paravalvular leaks and migration of the valve component **412** within the aortic walls. The fibers **234** extend outwardly from the proximal section **220** and inwardly into the passageway **232**. As illustrated, the fibers **234** are arcuate. It should be appreciated that in other embodiments the outer frame **216** may be covered with hydrogel or other sealing materials. In other embodiments, a plurality of barbs or hooks may be attached to the proximal section **220**. The hooks may be configured to further engage the tissue of the aorta and inhibit or prevent migration of the device **10**.

Amendments to the Claims:

The claims are amended as follows and will replace all previous versions and listings of claims:

Listing of Claims:

Claims 1-2 (Canceled)

3. (Currently Amended) An endovascular prosthetic heart valve assembly having improved sealing for addressing paravalvular leakage for use in a patient, comprising:

a frame formed of a plurality of cells,

wherein the plurality of cells defines at least two rows of cells at an inflow end of the frame,

wherein the frame is radially expandable from a radially compressed orientation to a radially expanded orientation;

a leaflet assembly within the frame;

a polymer covering about the leaflet assembly that is positioned radially inwardly of the frame and engaged with the leaflet assembly for providing sealing against paravalvular leakage; and

a sealing assembly that includes a plurality of arcuate fibers that extend away from the frame for providing sealing against paravalvular leakage,

wherein the sealing assembly extends over each of the at least two rows of cells,

wherein the sealing assembly lays against the frame when the prosthetic heart valve assembly is in the radially compressed orientation and the radially expanded orientation,

wherein the prosthetic heart valve assembly is sized and shaped to be endovascularly deployed through a femoral artery of the patient,

wherein the prosthetic heart valve assembly defines spacings extending through a thickness of the sealing assembly that allow fluid to pass therethrough when the prosthetic heart valve assembly is in an undeployed state,

wherein, in operation, expansion of the prosthetic heart valve assembly to the radially expanded orientation in a deployed state:

presses the sealing assembly against the native leaflets of the aorta to impart compression of the sealing assembly that compresses the plurality of fibers relative to the spacings thereby reducing the spacings; and

expands the polymer covering radially outwardly,

wherein the compression of the plurality of fibers relative to the spacings and the expansion of the polymer covering cooperatively create a paravalvular seal about the frame and the native leaflets by reducing the spaces in the sealing assembly ~~material~~.

4. (Previously Presented) The prosthetic heart valve assembly of claim 3, wherein the frame is self-expanding.

5. (Previously Presented) The prosthetic heart valve assembly of claim 3, wherein the frame defines an hour glass shape.

6. (Previously Presented) The prosthetic heart valve assembly of claim 3, wherein the plurality of cells are a same shape.

7. (Previously Presented) The prosthetic heart valve assembly of claim 3, wherein the frame is integrally formed.

8. (Previously Presented) The prosthetic heart valve assembly of claim 3, wherein the plurality of fibers define fibers that extend outwardly to a tip of each respective fiber.

9. (Canceled)

REMARKS

This is in response to the Office Action mailed August 23, 2022.

Information Disclosure Statement

The USPTO indicates that a large number of references are provided in the IDSes of record and requests that Applicant point out any particular references in the IDS which it is believed may be of particular relevance to the instant claimed invention.

Applicant notes that the most relevant references may be Spenser I (USPN 7,510,575, see FIG. 44a), Spenser II (WO 2006005015, see FIG. 22), Levi (USPN 9,393,110, generally), Norris (USPN 7,921,678), Greenhaulgh (US Publication 20020052649), and the NPL of Walther[1] and Cheung (see page 155 of the NPL filed on August 7, 2022, referred to therein and in Walther as 9000MIS) as referenced in many of the documents filed on the IDS dated August 7, 2022.

Specification

The Specification was objected to as failing to provide proper antecedent basis. Specifically, "the language lacks clear antecedent basis from the remainder of the specification. For example, the terminology "arcuate fibers" is not found in the specification."

Applicant has amended paragraph 0084 to recite <u>As illustrated, the fibers **234** are arcuate.</u> This is well-illustrated throughout the drawings. For example, Fig. 20 illustrates:

[1] https://academic.oup.com/ejcts/article/40/5/1120/446481, last accessed 8/22/2022.

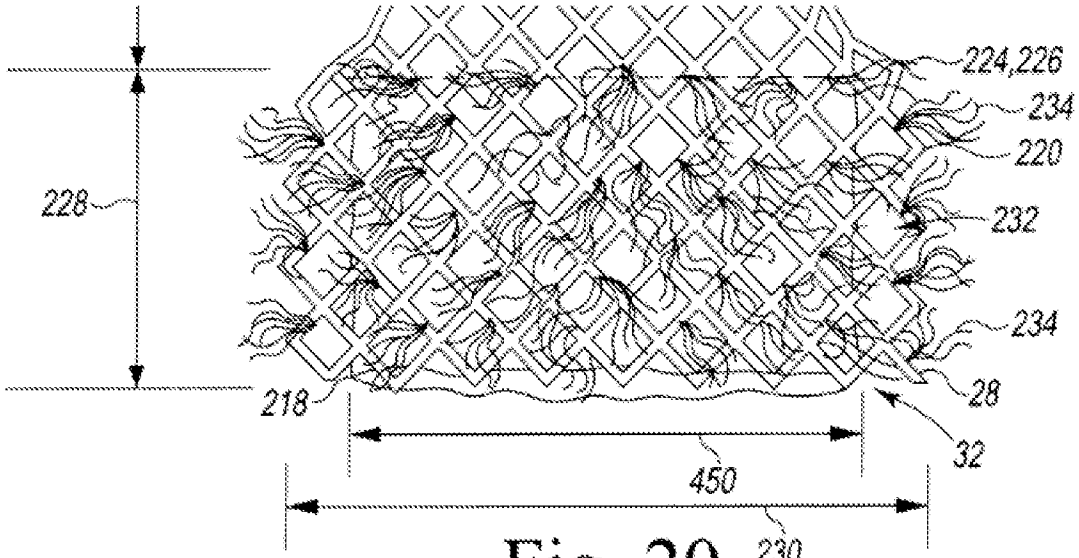


Fig. 20

Thus, the amendment to the specification is supported by the originally filed drawings and no new matter is presented by way of the amendment.

Claim Interpretation

It appears as if each of the claim limitations has been interpreted outside of Section 112(f) interpretation.

35 USC 112 Rejection

Claim 9 stands rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement. Applicant submits that the specification and figures support the claim, however, Applicant is choosing to cancel claim 9 in order to progress the matter to allowance.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any otherwise unpaid fees associated with the filing of this correspondence to Deposit Account No. **50-6191**.

Respectfully submitted,

Date: August 23, 2022

/Justin R. Nifong/
Justin R. Nifong
Reg. No. 59,389

NK Patent Law
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Electronic Acknowledgement Receipt

EFS ID:	46462933
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	23-AUG-2022
Filing Date:	12-APR-2022
Time Stamp:	07:20:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		426-2-25-UTIL-rsp-to-FOA-dtd-8-23-2022.pdf	223513 3d6590c259edfafdf48cb52684649c5125134ff3	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Specification	2	2
	Claims	3	4
	Applicant Arguments/Remarks Made in an Amendment	5	7
Warnings:			
Information:			
	Total Files Size (in bytes):	223513	

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New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 08/23/2022

Aortic Innovations, LLC
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EXAMINER	
PREBILIC, PAUL B	

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
08/23/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

Office Action Summary	Application No. 17/719,160	Applicant(s) Shahriari, Ali	
	Examiner PAUL PREBILIC	Art Unit 3774	AIA (FITF) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on August 7, 2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

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

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 3-9 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 3-8 is/are allowed.

7) ☑ Claim(s) 9 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

Applicant should note that the large number of references in the attached IDS have been considered by the examiner in the same manner as other documents in Office search files are considered by the examiner while conducting a search of the prior art in a proper field of search. **See MPEP 609.05(b).** Applicant is requested to point out any particular references in the IDS which they believe may be of particular relevance to the instant claimed invention in response to this office action.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: In base claim 3, the language lacks clear antecedent basis from the remainder of the specification. For example, the terminology “arcuate fibers” is not found in the specification; see line 12 of claim 3.

Claim Interpretation

The claims in this application are given their broadest reasonable interpretation using the plain meaning of the claim language in light of the specification as it would be understood by one of ordinary skill in the art. The broadest reasonable interpretation of a claim element (also commonly referred to as a claim limitation) is limited by the description in the specification when 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is invoked.

As explained in MPEP § 2181, subsection I, claim limitations that meet the following three-prong test will be interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

Use of the word "means" (or "step") in a claim with functional language creates a rebuttable presumption that the claim limitation is to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is rebutted when the claim limitation recites sufficient structure, material, or acts to entirely perform the recited function.

Absence of the word "means" (or "step") in a claim creates a rebuttable presumption that the claim limitation is not to be treated in accordance with 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. The presumption that the claim limitation is not interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth

paragraph, is rebutted when the claim limitation recites function without reciting sufficient structure, material or acts to entirely perform the recited function.

Claim limitations in this application that use the word "means" (or "step") are being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action. Conversely, claim limitations in this application that do not use the word "means" (or "step") are not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, except as otherwise indicated in an Office action.

In claim 3, the language "for providing" is utilized in two places, but this language has been interpreted in a broadest reasonable manner because each is associated with sufficient structure to take it out of a Section 112(f) type interpretation.

In claim 9, the language "frame for supporting the leaflet assembly" has also been interpreted in a broadest reasonable manner because it is associated with sufficient structural features.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 9 is rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. The subject matter of "the polymer covering forms an inner frame for supporting the leaflet assembly" is not supported from the original disclosure.

Allowable Subject Matter

Claims 3-8 are allowed over the prior art of record.

Response to Arguments

Applicant's arguments with respect to claim 2 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicant should specifically point out the support for any amendments made to the disclosure, including the claims (MPEP 714.02 and 2163.06). Due to the procedure outlined in MPEP 2163.06 for interpreting claims, it is noted that other art may be applicable under 35 USC 102 of 35 USC 103(a) once the aforementioned issue(s) is/are addressed.

Claim elements in this application that use the word "means" (or "step for") are presumed to invoke § 112(f) except as otherwise indicated in an Office action. Similarly, claim elements that do not use the word "means" (or "step for") are presumed not to invoke § 112(f) except as otherwise indicated in an Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL PREBILIC whose telephone number is (571)272-4758. The examiner can normally be reached on Monday, Tuesday, Thursday, and Friday from 8:00 am until 6:00 pm Eastern Time Zone.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerrah Edwards, can be reached at telephone number 408-918-7557. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal. Should you have questions about access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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

/PAUL B PREBILIC/
Primary Examiner, Art Unit 3774

Notice of References Cited	Application/Control No. 17/719,160	Applicant(s)/Patent Under Reexamination Shahriari, Ali	
	Examiner PAUL PREBILIC	Art Unit 3774	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-10792172-B2	10-2020	Shahriari; Ali	A61F2/2418	1/1
*	B	US-10857011-B2	12-2020	Shahriari; Ali	A61F2/856	1/1
*	C	US-10881538-B1	01-2021	Shahriari; Ali	A61F2/962	1/1
*	D	US-10888441-B1	01-2021	Shahriari; Ali	A61F2/07	1/1
*	E	US-10966846-B2	04-2021	Shahriari; Ali	A61F2/82	1/1
*	F	US-10987236-B1	04-2021	Shahriari; Ali	A61F2/2418	1/1
*	G	US-11026817-B2	06-2021	Shahriari; Ali	A61F2/962	1/1
*	H	US-11045335-B2	06-2021	Shahriari; Ali	A61F2/962	1/1
*	I	US-11129735-B2	09-2021	Shahriari; Ali	A61F2/07	1/1
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	Art Unit
	PAUL PREBILIC	3774

CPC - Searched*		
Symbol	Date	Examiner
A61F 2/856,07,2418,82,962,24,86,89,90; 2002/061067; 2210/00,0014,0057; 220/0008,0016,0025,0058,0075; 2230/001,0034,0067; 2250/0048,0069	07/13/2022	T.S.

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
Assignee/Inventor Search	07/13/2022	T.S,
EAST Search	07/13/2022	T.S.
Performed text searches via SEARCH.	08/16/2022	/PBP/
Updated CPC searches via SEARCH.	08/16/2022	/PBP/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/PAUL B PREBILIC/ Primary Examiner, Art Unit 3774	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
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			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L23	6435	A61F2/24.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L24	12505	A61F2/86.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L25	17838	A61F2/89.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L26	30379	A61F2/90.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/08/16 04:09 PM

			AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L27	9061	A61F2002/061.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L28	7435	A61F2002/067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L29	1420	A61F2210/00.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/08/16 04:09 PM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L30	20938	A61F2210/0014.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L31	2937	A61F2210/0057.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L32	19517	A61F2220/0008.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L33	24597	A61F2220/0016.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/08/16 04:10 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L34	48022	A61F2220/0025.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L35	13535	A61F2220/0058.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L36	28138	A61F2220/0075.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2022/08/16 04:10 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L37	5821	A61F2230/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L38	4693	A61F2230/0034.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L39	22034	A61F2230/0067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L40	2659	A61F2250/0048.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/08/16 04:11 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L41	7511	A61F2250/0069.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L42	170	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220713"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:19 PM
L43	7929	(heart AND valve AND (frame OR stent OR scaffold$3) AND cells AND expand$4 AND leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/08/16 04:51 PM

			IBM_TDB)				
L44	763	(heart SAME valve SAME (frame OR stent OR scaffold$3) SAME cells SAME expand$4 SAME leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:52 PM
L45	0	17/719610	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:02 AM
L46	63	13/706896	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:03 AM
L47	31	13/706896	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L48	1	13/706896.app.	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L49	30	("20020052649" OR "20020151958" OR "20030204249" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 11:50 AM

		"20030236567" OR "20040082989" OR "20040256759" OR "20060195183" OR "20080262593" OR "20080275540" OR "20100298927" OR "20110022157" OR "20110098802" OR "20110218619" OR "3725961" OR "5665117" OR "6110198" OR "6221102" OR "6547820" OR "6663667" OR "6729356" OR "6821297" OR "6918926" OR "7510575" OR "7524331" OR "7585321" OR "7921678" OR "7993394" OR "8408214" OR "9039757" OR "9393110").pn.					
L50	1	("10792172").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:18 PM
L51	1	("10966846").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:24 PM
L52	1	("11129735").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:32 PM
L53	1	("10987236").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:34 PM
L54	1	("10857011").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:38 PM
L55	1	("10881538").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:01 PM
L56	1	("10888441").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:02 PM
L57	1	("11026817").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:03 PM
L58	1	("11045335").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:05 PM
L59	9	6 7 8 9 10 11 12 13 14	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:24 PM
L60	433600	15 arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L61	2	15 AND arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L62	8742	A61F2/856.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/08/16 04:08 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L63	42045	A61F2/07.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L64	29978	A61F2/2418.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L65	29295	A61F2/82.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/08/16 04:08 PM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L66	4385	A61F2/962.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L67	6435	A61F2/24.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L68	12505	A61F2/86.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L69	17838	A61F2/89.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/08/16 04:09 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L70	30379	A61F2/90.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L71	9061	A61F2002/061.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L72	7435	A61F2002/067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/08/16 04:09 PM

			JPO; DERWENT; IBM_TDB)				
L73	1420	A61F2210/00.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L74	20938	A61F2210/0014.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L75	2937	A61F2210/0057.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L76	19517	A61F2220/0008.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/08/16 04:10 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L77	24597	A61F2220/0016.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L78	48022	A61F2220/0025.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L79	13535	A61F2220/0058.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM

L80	28138	A61F2220/0075.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L81	5821	A61F2230/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L82	4693	A61F2230/0034.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L83	22034	A61F2230/0067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/08/16 04:10 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L84	2659	A61F2250/0048.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L85	7511	A61F2250/0069.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L86	170	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220713"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:19 PM
L87	7929	(heart AND valve AND (frame OR stent OR	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/08/16 04:51 PM

		scaffold$3) AND cells AND expand$4 AND leaflet AND polymer$3 AND seal$4)	AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L88	763	(heart SAME valve SAME (frame OR stent OR scaffold$3) SAME cells SAME expand$4 SAME leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:52 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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

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

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	SHIPMON, TIFFANY P
Attorney Docket Number	426/2/25 UTIL

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.B.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	SHIPMON, TIFFANY P
	Attorney Docket Number	426/2/25 UTIL

	1	Inter Partes Review IPR2021-01584 dated April 1, 2022
	2	Inter Partes Review IPR2021-01527 dated March 17, 2022
	3	EP Examination report dated March 11, 2022 for EP Application No. 20172681.7
	4	Inter Partes Review IPR2022-00034 dated April 1, 2022
	5	Inter Partes Review IPR2022-00193 dated April 25, 2022, and May 18, 2022
	6	Inter Partes Review IPR2022-00549 dated February 4, 2022
	7	Inter Partes Review IPR2022-00556 dated February 7, 2022
	8	BULLER, Nigel, Deposition dated June 17, 2022 in IPR 2021-01527
	9	Inter Partes Review IPR2022-00034, dated June 14, 2022

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

EXAMINER SIGNATURE

Examiner Signature	/PAUL B PREBILIC/	Date Considered	08/16/2022

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.B.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	SHIPMON, TIFFANY P
Attorney Docket Number	426/2/25 UTIL

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.B.P/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	SHIPMON, TIFFANY P
Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-07-31
Name/Print	Justin R. Nifong	Registration Number	59389

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

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

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

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

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

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

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

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

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

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

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

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

/PAUL B PREBILIC/ 08/16/2022

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.B.P/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	0	17/719610	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:02 AM
L2	63	13/706896	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 10:03 AM
L3	31	13/706896	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L4	1	13/706896.app.	(US-PGPUB)	OR	ON	ON	2022/08/16 10:03 AM
L5	30	("20020052649" OR "20020151958" OR "20030204249" OR "20030236567" OR "20040082989" OR "20040256759" OR "20060195183" OR "20080262593" OR "20080275540" OR "20100298927" OR "20110022157" OR "20110098802" OR "20110218619" OR "3725961" OR "5665117" OR "6110198" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 11:50 AM

		"6221102" OR "6547820" OR "6663667" OR "6729356" OR "6821297" OR "6918926" OR "7510575" OR "7524331" OR "7585321" OR "7921678" OR "7993394" OR "8408214" OR "9039757" OR "9393110").pn.					
L6	1	("10792172").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:18 PM
L7	1	("10966846").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:24 PM
L8	1	("11129735").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:32 PM
L9	1	("10987236").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:34 PM
L10	1	("10857011").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 01:38 PM
L11	1	("10881538").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:01 PM
L12	1	("10888441").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:02 PM
L13	1	("11026817").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:03 PM
L14	1	("11045335").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 02:05 PM
L15	9	6 7 8 9 10 11 12 13 14	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:24 PM
L16	433600	15 arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L17	2	15 AND arcuate	(US-PGPUB; USPAT)	OR	ON	ON	2022/08/16 03:25 PM
L18	8742	A61F2/856.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM

L19	42045	A61F2/07.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L20	29978	A61F2/2418.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L21	29295	A61F2/82.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L22	4385	A61F2/962.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/08/16 04:08 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L23	6435	A61F2/24.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L24	12505	A61F2/86.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:08 PM
L25	17838	A61F2/89.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L26	30379	A61F2/90.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/08/16 04:09 PM

			AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L27	9061	A61F2002/061.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L28	7435	A61F2002/067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L29	1420	A61F2210/00.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/08/16 04:09 PM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L30	20938	A61F2210/0014.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L31	2937	A61F2210/0057.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:09 PM
L32	19517	A61F2220/0008.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L33	24597	A61F2220/0016.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/08/16 04:10 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L34	48022	A61F2220/0025.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L35	13535	A61F2220/0058.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L36	28138	A61F2220/0075.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2022/08/16 04:10 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L37	5821	A61F2230/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L38	4693	A61F2230/0034.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L39	22034	A61F2230/0067.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:10 PM
L40	2659	A61F2250/0048.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/08/16 04:11 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L41	7511	A61F2250/0069.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:11 PM
L42	170	(18 19 20 21 22 23 24 25 26 27 28) AND (29 30 31 32 33 34 35 36 37 38 39 40 41) AND @pd>="20220713"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:19 PM
L43	7929	(heart AND valve AND (frame OR stent OR scaffold$3) AND cells AND expand$4 AND leaflet AND polymer$3 AND seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/08/16 04:51 PM

L44	763	(heart SAME valve SAME (frame OR stent OR scaffold$3) SAME cells SAME expand$4 SAME leaflet AND polymer$3 AND seal$4)	IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/08/16 04:52 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3725961		1973-04-10	Magovern et al.	
	2	5665117		1997-09-09	Rhodes	
	3	6110198		2000-08-29	Fogarty et al.	
	4	6221102		2001-04-24	Baker et al.	
	5	6547820		2003-04-15	Staudenmeier	
	6	6663667		2003-12-16	Dehdashtian et al.	
	7	6729356		2004-05-04	Baker et al.	
	8	6821297		2004-11-23	Snyders	

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	Application Number	17719160
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	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	9	6918926		2005-07-19	Letort	
	10	7510575		2009-03-31	Spenser et al.	
	11	7524331		2009-04-28	Birdsall	
	12	7585321		2009-09-08	Cribier	
	13	7921678		2011-04-12	Norris et al.	
	14	7993394		2011-08-09	Hariton et al.	
	15	8408214		2013-04-02	Spenser	
	16	9039757		2015-05-26	McLean et al.	
	17	9393110		2016-07-19	Levi et al.	

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

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First Named Inventor	Ali Shahriari
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Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

	1	20020052649	A1	2002-05-02	Greenhalgh	
	2	20020151958	A1	2002-10-17	Chuter	
	3	20030204249	A1	2003-10-30	Letort	
	4	20030236567	A1	2003-12-25	Elliot	
	5	20040082989	A1	2004-04-29	Cook William A. et al.	
	6	20040256759	A1	2004-12-23	Hartley	
	7	20060195183	A1	2006-08-31	Navia et al.	
	8	20080262593	A1	2008-10-23	Ryan et al.	
	9	20080275540	A1	2008-11-06	Wen	
	10	20100298927	A1	2010-11-25	Greenberg	
	11	20110022157	A1	2011-01-27	Essinger et al.	

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Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

	12	20110098802	A1	2011-04-28	Braido et al.		
	13	20110218619	A1	2011-09-08	Benichou et al.		

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2006005015	WO	A2	2006-01-12	Spenser, Benjamin		
	2	2011051043	WO	A1	2011-05-05	Essinger, Jacques		

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DUNN, Linda, Invalidity Contentions dated 8/3/2022	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

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

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First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-08-07
Name/Print	Justin R. Nifong	Registration Number	59389

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

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

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

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

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

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

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

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

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

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

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

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

/PAUL B PREBILIC/ 08/16/2022

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PTO/SB/06 (09-11)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/719,160	Filing Date 04/12/2022	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/23/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 6	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/NICOLE L NICHOLSON/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	Shipmon
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3725961		1973-04-10	Magovern et al.	
	2	5665117		1997-09-09	Rhodes	
	3	6110198		2000-08-29	Fogarty et al.	
	4	6221102		2001-04-24	Baker et al.	
	5	6547820		2003-04-15	Staudenmeier	
	6	6663667		2003-12-16	Dehdashtian et al.	
	7	6729356		2004-05-04	Baker et al.	
	8	6821297		2004-11-23	Snyders	

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	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

	9	6918926		2005-07-19	Letort	
	10	7510575		2009-03-31	Spenser et al.	
	11	7524331		2009-04-28	Birdsall	
	12	7585321		2009-09-08	Cribier	
	13	7921678		2011-04-12	Norris et al.	
	14	7993394		2011-08-09	Hariton et al.	
	15	8408214		2013-04-02	Spenser	
	16	9039757		2015-05-26	McLean et al.	
	17	9393110		2016-07-19	Levi et al.	

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	Attorney Docket Number	426/2/25 UTIL

	1	20020052649	A1	2002-05-02	Greenhalgh	
	2	20020151958	A1	2002-10-17	Chuter	
	3	20030204249	A1	2003-10-30	Letort	
	4	20030236567	A1	2003-12-25	Elliot	
	5	20040082989	A1	2004-04-29	Cook William A. et al.	
	6	20040256759	A1	2004-12-23	Hartley	
	7	20060195183	A1	2006-08-31	Navia et al.	
	8	20080262593	A1	2008-10-23	Ryan et al.	
	9	20080275540	A1	2008-11-06	Wen	
	10	20100298927	A1	2010-11-25	Greenberg	
	11	20110022157	A1	2011-01-27	Essinger et al.	

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	Examiner Name	Shipmon
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	12	20110098802	A1	2011-04-28	Braido et al.	
	13	20110218619	A1	2011-09-08	Benichou et al.	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2006005015	WO	A2	2006-01-12	Spenser, Benjamin		
	2	2011051043	WO	A1	2011-05-05	Essinger, Jacques		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DUNN, Linda, Invalidity Contentions dated 8/3/2022	

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Examiner Signature		Date Considered	

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

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

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	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	Shipmon
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-08-07
Name/Print	Justin R. Nifong	Registration Number	59389

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

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

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

Electronic Patent Application Fee Transmittal

Application Number:	17719160
Filing Date:	12-Apr-2022
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Filer:	Justin Robert Nifong
Attorney Docket Number:	426/2/25 UTIL

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	130	130
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	46356994
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	07-AUG-2022
Filing Date:	12-APR-2022
Time Stamp:	09:08:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$130
RAM confirmation Number	E202287011102101
Deposit Account	506191
Authorized User	Justin Nifong
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Edwards-inval-IDS-426-2-25.pdf	1035264 8544cdfc93888cf80d535c65b3bc470da96cc230	no	7
Warnings:					
Information:					
2	Non Patent Literature	WO2011051043A1.pdf	4015047 ad3a30ffb0d66f4ba31136e4ca138bac8113ef9b	no	82
Warnings:					
Information:					
3	Non Patent Literature	WO2006005015A2.pdf	2589682 72e0a4b604ab919eca8aaf04856332b70c67ae42	no	68
Warnings:					
Information:					
4	Non Patent Literature	Inval-contentions-printed-8-6-2022-3.pdf	13170286 5e586ab73b82c339f39f907928bc630f8afc6dba	no	1137
Warnings:					
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5	Fee Worksheet (SB06)	fee-info.pdf	38137 11f5d5764bc1f6e78fc9917f2cb1501334d82936	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	20848416		

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

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New International Application Filed with the USPTO as a Receiving Office

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL

CONFIRMATION NO. 1031

175373
Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

PUBLICATION NOTICE

OC000000135615300

Title:TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

Publication No.US-2022-0241097-A1
Publication Date:08/04/2022

NOTICE OF PUBLICATION OF APPLICATION

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

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

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

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

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

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

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(Not for submission under 37 CFR 1.99)

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Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	SHIPMON, TIFFANY P
Attorney Docket Number	426/2/25 UTIL

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	SHIPMON, TIFFANY P
	Attorney Docket Number	426/2/25 UTIL

	1	Inter Partes Review IPR2021-01584 dated April 1, 2022
	2	Inter Partes Review IPR2021-01527 dated March 17, 2022
	3	EP Examination report dated March 11, 2022 for EP Application No. 20172681.7
	4	Inter Partes Review IPR2022-00034 dated April 1, 2022
	5	Inter Partes Review IPR2022-00193 dated April 25, 2022, and May 18, 2022
	6	Inter Partes Review IPR2022-00549 dated February 4, 2022
	7	Inter Partes Review IPR2022-00556 dated February 7, 2022
	8	BULLER, Nigel, Deposition dated June 17, 2022 in IPR 2021-01527
	9	Inter Partes Review IPR2022-00034, dated June 14, 2022

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	SHIPMON, TIFFANY P
	Attorney Docket Number	426/2/25 UTIL

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	SHIPMON, TIFFANY P
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-07-31
Name/Print	Justin R. Nifong	Registration Number	59389

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	46310088
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	31-JUL-2022
Filing Date:	12-APR-2022
Time Stamp:	18:37:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	426-2-25UTIL-ids-master.pdf	1034513 de6b551d413289a97a3ae6001d262f51cd10531a	no	5

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A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
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9	Non Patent Literature	426-2-npl-binder-5-24-2022-printed.pdf	7448350 ae16655cc6ea8d42d4e840f7e1dd4265cff951c9	no	268
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		Total Files Size (in bytes):	68091959		

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

COMMUNICATION TO THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	1031
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	Shipmon		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: DEVICE FOR AORTIC REPAIR AND METHOD OF USING THE SAME

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

RESPONSE TO OFFICE ACTION

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 4 of this paper.

Amendments to the Claims:

The claims are amended as follows and will replace all previous versions and listings of claims:

Listing of Claims:

Claims 1-2 (Canceled)

3. (New) An endovascular prosthetic heart valve assembly having improved sealing for addressing paravalvular leakage for use in a patient, comprising:

a frame formed of a plurality of cells,

wherein the plurality of cells defines at least two rows of cells at an inflow end of the frame,

wherein the frame is radially expandable from a radially compressed orientation to a radially expanded orientation;

a leaflet assembly within the frame;

a polymer covering about the leaflet assembly that is positioned radially inwardly of the frame and engaged with the leaflet assembly for providing sealing against paravalvular leakage; and

a sealing assembly that includes a plurality of arcuate fibers that extend away from the frame for providing sealing against paravalvular leakage,

wherein the sealing assembly extends over each of the at least two rows of cells,

wherein the sealing assembly lays against the frame when the prosthetic heart valve assembly is in the radially compressed orientation and the radially expanded orientation,

wherein the prosthetic heart valve assembly is sized and shaped to be endovascularly deployed through a femoral artery of the patient,

wherein the prosthetic heart valve assembly defines spacings extending through a thickness of the sealing assembly that allow fluid to pass therethrough when the prosthetic heart valve assembly is in an undeployed state,

wherein, in operation, expansion of the prosthetic heart valve assembly to the radially expanded orientation in a deployed state:

presses the sealing assembly against the native leaflets of the aorta to impart compression of the sealing assembly that compresses the plurality of fibers relative to the spacings thereby reducing the spacings; and

expands the polymer covering radially outwardly,

wherein the compression of the plurality of fibers relative to the spacings and the expansion of the polymer covering cooperatively create a paravalvular seal about the frame and the native leaflets by reducing the spaces in the sealing material.

4. (New) The prosthetic heart valve assembly of claim 3, wherein the frame is self-expanding.

5. (New) The prosthetic heart valve assembly of claim 3, wherein the frame defines an hour glass shape.

6. (New) The prosthetic heart valve assembly of claim 3, wherein the plurality of cells are a same shape.

7. (New) The prosthetic heart valve assembly of claim 3, wherein the frame is integrally formed.

8. (New) The prosthetic heart valve assembly of claim 3, wherein the plurality of fibers define fibers that extend outwardly to a tip of each respective fiber.

9. (New) The prosthetic heart valve assembly of claim 3, wherein the polymer covering forms an inner frame for supporting the leaflet assembly.

REMARKS

Claim 2 stands rejected under 35 USC 103 as being obvious over Nguyen in view of Greenhalgh. Applicant is choosing to present the newly added limitations in the independent claim in new claim 3 for readability reasons. The inventive concept remains the same.

The first independent claim now recites:

An endovascular prosthetic heart valve assembly having improved sealing for addressing paravalvular leakage for use in a patient, comprising:

a frame formed of a plurality of cells,

wherein the plurality of cells defines at least two rows of cells at an inflow end of the frame,

wherein the frame is radially expandable from a radially compressed orientation to a radially expanded orientation;

a leaflet assembly within the frame;

a polymer covering about the leaflet assembly that is positioned radially inwardly of the frame and engaged with the leaflet assembly for providing sealing against paravalvular leakage; and

a sealing assembly that includes a plurality of arcuate fibers that extend away from the frame for providing sealing against paravalvular leakage,

wherein the sealing material extends over each of the at least two rows of cells,

wherein the sealing assembly lays against the frame when the prosthetic heart valve assembly is in the radially compressed orientation and the radially expanded orientation,

wherein the prosthetic heart valve assembly is sized and shaped to be endovascularly deployed through a femoral artery of the patient,

wherein the prosthetic heart valve assembly defines spacings extending through a thickness of the sealing assembly that allow fluid to pass therethrough when the heart valve assembly is in an undeployed state,

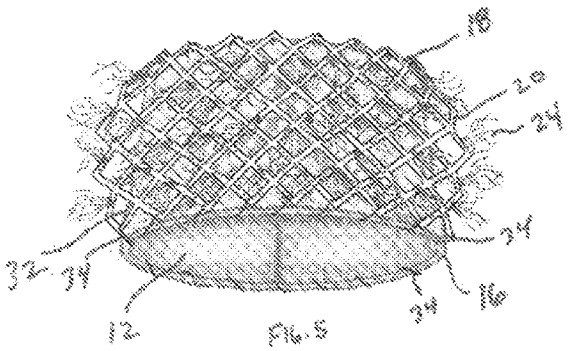
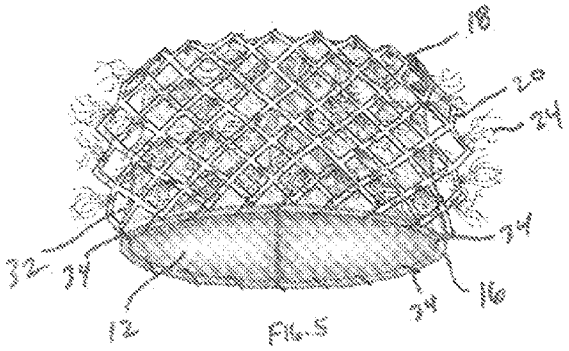
wherein, in operation, expansion of the valve assembly to the radially expanded orientation in a deployed state:

presses the sealing assembly against the native leaflets of the aorta to impart compression of the sealing assembly that compresses the plurality of fibers relative to the spacings thereby reducing the spacings; and

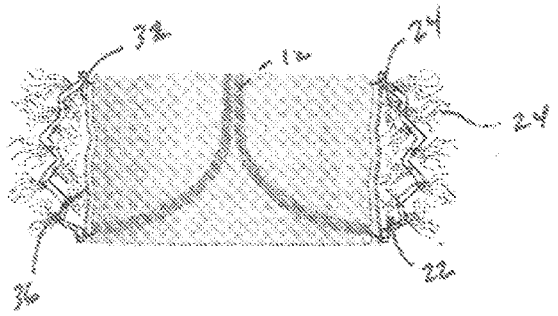
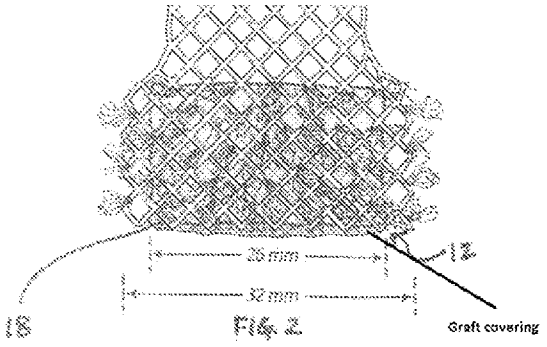
expands the polymer covering radially outwardly,

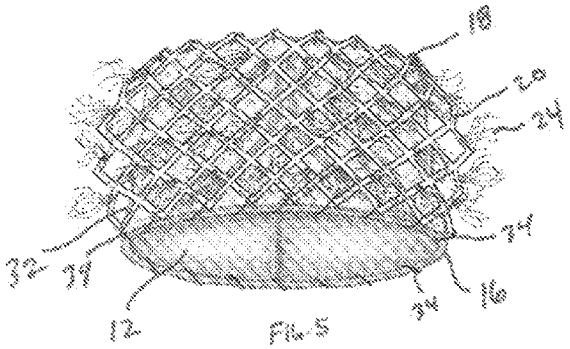
wherein the compression of the plurality of fibers relative to the spacings and the expansion of the polymer covering cooperatively create a paravalvular seal about the frame and the native leaflets by reducing the spaces in the sealing material.

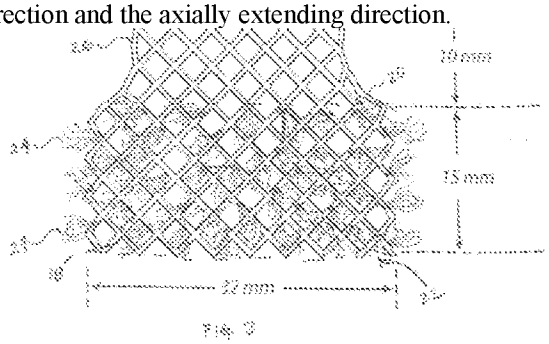
Independent claim 3 finds written description and enablement support in at least US Provisional Patent Application No. 61/723,446 filed on November 7, 2012 in the table that follows[1]:

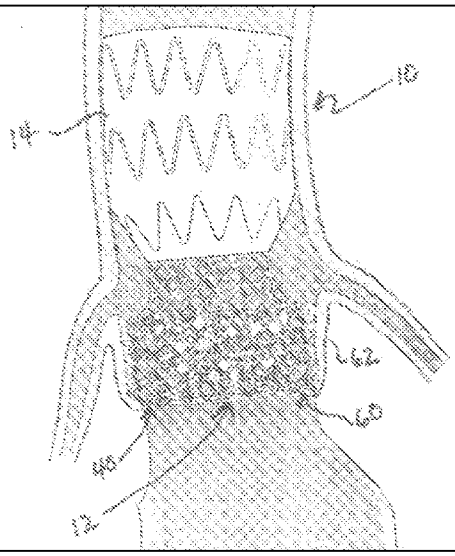
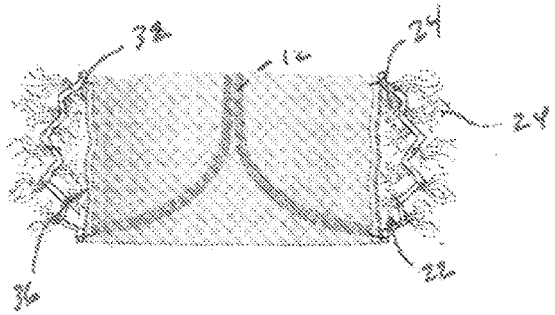
Claims	Provisional Patent Application No. 61/723,446 Except Where Indicated
3. An endovascular prosthetic heart valve assembly having improved sealing for addressing paravalvular leakage for use in a patient, comprising:	The specification is directed towards an endovascularly deployed heart valve assembly
a frame formed of a plurality of cells,	A frame is illustrated in FIG. 5:  FIG. 5 *[0022] …. The frame 16 is formed from a metallic material….* The frame is illustrated being secured to the graft covering in FIG. 5 reproduced above. The frame has an inflow end portion (shown at the bottom) and an outflow end portion (shown at the top). In FIG. 5, the frame is illustrated being secured to the graft covering by sutures 34.
wherein the plurality of cells defines at least two rows of cells at an inflow end of the frame,	The frame is illustrated having at least two rows of cells.  FIG. 5

[1] Additional reference is made to US Application No. 13/706,896 filed on December 6, 2012 for exemplary purposes.

wherein the frame is radially expandable from a radially compressed orientation to a radially expanded orientation;	The frame is described and illustrated as expandable. *[0033] ... The self-expanding outer frame 16 is deployed...* *[0034] ... Expansion of the ... outer frame 16 against the aortic annulus 60...*
a leaflet assembly within the frame;	A leaflet assembly 12 is shown within the frame.  FIG. 4
a polymer covering about the leaflet assembly that is positioned radially inwardly of the frame and engaged with the leaflet assembly for providing sealing against paravalvular leakage; and	*[0029] It should be appreciated that in other embodiments the tubular stent 32 may be formed from a polymeric material. In the illustrative embodiment, the tubular stent 32 is covered with low-profile polyester.* Additionally, the graft covering is clearly shown in FIG. 2:  FIG. 2 The specification discloses that the graft covering is for engaging prosthetic heart valve leaflets.
a sealing assembly that includes a plurality of fibers that extend away from the frame for providing sealing against paravalvular leakage,	The sealing material is disclosed as fibers. *[0024] ... The fibers 24 extend outwardly from the stent 20... ...* The specification discloses that the fibers are for treating paravalvular leaks.

wherein the sealing material extends over each of the at least two rows of cells,	The fibers are shown beginning at the inflow end portion and extending over at least two rows of cells formed in the open cell configuration of the frame:  FIG. 5
wherein the sealing assembly lays against the frame when the prosthetic heart valve assembly is in the radially compressed orientation and the radially expanded orientation,	The fibers are illustrated in contact with the frame along a height of the sealing material.
wherein the prosthetic heart valve assembly is sized and shaped to be endovascularly deployed through a femoral artery of the patient,	*[0021] The device 10 may be deployed via a transfemoral or transaxillary route…..* This is not only disclosed and satisfies written description requirements, but it is enabled also. The representative valve illustrated is a 32 mm valve and is described as a "particular, non-limiting example." The metallic frame is shown having an open cell pattern and it is widely known that metallic frames of an open cell pattern are compressible. The covered distal portion is shown with z-stents that are spaced-apart to allow compressibility of the frame. The low density fiber construction that includes spacings between fibers allows for compression of the valve assembly without the outer seal adding prohibitively to crimp profile. *[0033] The delivery of the transcatheter valve device 10 may begin by gaining access to the left ventricle across the native aortic valve… An over the wire introduce system, including a guidewire, is used to introduce the device 10 into the aorta. After the guidewire has been placed into the left ventricle via the iliofemoral, subclavian, or carotid vessels, the device 10 is delivered through the common femoral artery and passed across the native aortic valve… the self-expanding outer frame 16 is deployed, thereby stabilizing the device 10 in place…* As further described in Application No. 13/706,896: *As shown in FIG. 14, the balloon-expandable inner frame **218** may be expanded in the direction indicated*

	*by arrows **266**. As described above, the diameter **230** of the proximal section **220** of the outer frame **216** is oversized relative to the diameter of the aortic annulus **210**. As such, when the component **212** is implanted, the proximal section **220** is reduced to the diameter of the annulus **210**. Because the expanded diameter **252** of the stent **244** is greater than the diameter of the annulus, the outer surface **248** of the stent **244** engages the fibers **234** (and hence the inner surface of the proximal section **220** of the outer frame **216**) through the covering material **250**. In that way, the gap **264** is closed, and the fibers **234** and the covering material **250** create a seal between the inner frame **218** and the outer frame **216**.* *As shown in FIG. 17, the stent **38** of the balloon-expandable frame **34** has a diameter **46**. As described in greater detail below, the balloon-expandable frame **34** is expandable during implantation from an unexpanded diameter (not shown) to the expanded diameter **46**. In the illustrative embodiment, the expanded diameter **46** is equal to approximately 26 mm when the frame **34** is expanded. In other embodiments, the expanded diameter may be greater than or less than 26 mm depending on, for example, the patient's anatomy. In the illustrative embodiment, the diameter **46** is oversized relative to the diameter of the aortic annulus **210** such that an interference fit is created between the stent **38** and the annulus **210** when the transcatheter valve component **312** is implanted.*
wherein the prosthetic heart valve assembly defines spacings extending through a thickness of the sealing assembly that allow fluid to pass therethrough when the heart valve assembly is in an undeployed state,	The fibers illustrate a spacing between fibers, where the spacing is in the circumferentially extending direction and the axially extending direction.  FIG. 9
wherein, in operation, expansion of the valve assembly to the radially expanded orientation in a deployed state presses the sealing assembly against the native leaflets of the aorta to impart compression of the sealing assembly that compresses the plurality of fibers relative to the spacings thereby reducing the spacings; and	The valve assembly is shown deployed where the sealing material is pressed against native leaflets of the patient. The material compresses in response to the pressing against the leaflets.

	
expands the polymer covering radially outwardly,	Expansion of the valve assembly expands the polymer covering radially outwardly. The graft covering as shown above in annotated FIG. 2 is further shown in many figures as extending around the prosthetic heart valve leaflets. For example, FIG. 6 illustrates:  FIG. 6
wherein the compression of the plurality of fibers relative to the spacings and the expansion of the polymer covering cooperatively create a paravalvular seal about the frame and the native leaflets by reducing the spaces in the sealing material.	*[0034] ... Expansion of the balloon-expandable inner frame 18 compresses the collagen fiber/hydrogel coated stent 20 of the outer frame 16 against the aortic annulus 60, thereby sealing the annulus 60 and the paravalvular areas 62, and thus prevents paravalvular leakage...* The "paravalvular areas 62" is illustrated as the area about the native valve leaflets. The spacings are shown being reduced upon compression of the fibers:

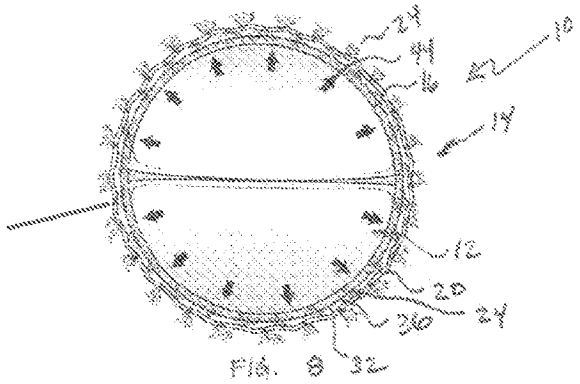


FIG. 9

NGUYEN TEACHES AWAY FROM MODIFYING THE DISCLOSED VALVE FRAME TO INCLUDE THE SEALING MATERIAL OF GREENHALGH

The Office Action indicates:

7. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nguyen et al. to include a sealing material external to the outer frame that comprises extending fibers as taught in Greenhalgh in order to further improve the seal of the device once implanted and prevent leakage.

MPEP 2144 recites:

A prima facie case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. U.S. v. Adams, 383 U.S. 39, 51-2 (1966). See also Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 567 F.3d 1314, 1326-27, 90 USPQ2d 1865, 1873 (Fed. Cir. 2009) and Allergan, Inc. v. Sandoz Inc., 796 F.3d 1293, 1305-05, 115 USPQ2d 2012, 2019 (Fed. Cir. 2015).

As such, according to the MPEP, if any material respect of the art teaches away from the claimed invention, then the prima facie case of obviousness may be rebutted.

Nguyen provides that:

*[0052] End tabs **39** are folded over the ends of the proximal-most row of cells of frame **12** to secure skirt **21** to the frame and seal against perivalvular bypass flows (see FIG. 1A). Because end tabs **39** are directly supported by the last zig-zag row of cells of frame **12**, there is no opportunity for an unsupported edge of the skirt to flap or otherwise extend into the flow path along the inflow edge of skirt **21**. Thus, the design of the valve prosthesis not only ensures that there are no flaps to disrupt flow or serve as sites for thrombus formation, but also reduces the risk that hemodynamic flow against such flaps could cause frame **12** to migrate.*

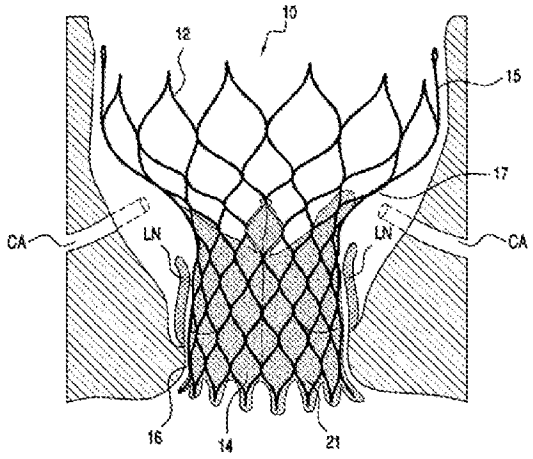


FIG.6

Nguyen thus provides that not only are end tabs 39 folded over the ends of the proximal-most row of cells of frame, but Nguyen also provides that "*there is no opportunity for an unsupported edge of the skirt to flap or otherwise extend into the flow path along the inflow edge of skirt **21**. Thus, the design of the valve prosthesis not only ensures that there are no flaps to disrupt flow or serve as sites for thrombus formation, but also reduces the risk that hemodynamic flow against such flaps could cause frame **12** to migrate.*"

This aspect is particularly important for Nguyen, which teaches a self-expanding frame that relies upon multiple contact points to seat the valve assembly (at the annulus of the aorta with the proximal end of the valve, and at the ascending aorta at the distal end of the valve) due to the reduced expansion forces associated with the large diameter cells of the self-expanding frame.

The proposed combination of Nguyen with the structure of Greenhalgh, namely the addition of outwardly extending fibers that increases overall profile and surface area, would necessarily "disrupt flow," "serve as a site for thrombus formation," and increase "the risk that

hemodynamic flow against such [fibers as opposed to flaps] could cause frame **12** to migrate." As such, Nguyen teaches away from the combination offered by the USPTO.

THE VALVE SHOWN IN NGUYEN LATER DESCRIBES THAT ADDITION OF AN OUTER SEAL IS NOT TRIVIAL AND MAY MAKE NGUYEN INOPERABLE FOR INTENDED PURPOSE WITHOUT SIGNIFICANT FURTHER MODIFICATIONS

The Nguyen reference is generally based on the Medtronic® Corevalve product. Medtronic continued to innovate in this space, and in 2014, two years after the effective filing date of the claimed invention, Medtronic filed an application (US Publication No. 2016-0120646 to Dwork) for a TAVR similar to Nguyen with an outer seal; thus Medtronic filed an application that had a modification of the addition of an outer seal, a modification similar to the one proposed by the USPTO.

In fact, Dwork specifically mentions that Dwork is an improvement over Nguyen:

> *[0027] FIG. 1 depicts an exemplary transcatheter valve prosthesis **100**. Transcatheter valve prosthesis **100** is illustrated herein in order to facilitate description of components attached thereto and/or integrated thereon for preventing and/or repairing paravalvular leakage according to embodiments hereof. It is understood that any number of alternate heart valve prostheses can be used with the components for preventing and/or repairing paravalvular leakage described herein. Transcatheter valve prosthesis **100** is merely exemplary and is described in more detail in U.S. Patent Application Pub. No. 2011/0172765 to Nguyen et al., which is incorporated by reference herein in its entirety.*

However, the Dwork filing appreciated how technically difficult the modification of Nguyen adding an outer seal of any type would be.

> *[0033] Conventionally when additional exterior skirt material is added to a transcatheter valve prosthesis, some portions of a self-expanding stent may be inadvertently pushed or displaced radially inward when the transcatheter valve prosthesis is compressed or contracted into a sheath for delivery. More particularly, when a transcatheter valve prosthesis without an exterior skirt, such as transcatheter valve prosthesis **100** described above, is compressed or contracted into a sheath of a delivery catheter, the struts of stent **102** are compressed to abut against each together in order to fit into the sheath and the outer surface of each strut presses against the inner surface of the sheath. The material of interior skirt **106** compresses or packs into the lumen of stent **102**. <u>However, when an</u>*

> *exterior skirt is added to a transcatheter valve prosthesis, the extra material may cause a portion of the stent to be pushed inwardly and any portions of the stent that are pushed inwardly no longer press against the inner surface of the sheath of the delivery catheter. With the addition of an exterior skirt and no further modifications to either the valve prosthesis or the delivery system, such as using a delivery system with a wider lumen diameter and also a greater delivery profile, the delivery configuration is unpredictable and may lead to erratic loading forces, deployment forces, and/or recapture forces. In order to accommodate the addition of exterior skirt **434**, stent **402** is formed such that at least one endmost crown thereof is positioned radially inwards with respect to the remaining endmost crowns as will be described in more detail herein.*

As such, the patentee of Nguyen later describes that a modification of Nguyen to include an outer seal must also include changes to the stent frame ("In order to accommodate the addition of exterior skirt 434 ….."). Thus, it is not that it wasn't possible to add an outer seal to Nguyen, but it would require significant modifications to the stent frame to do so, or a degradation in performance of the TAVR ("also a greater delivery profile"). The profile issue is particularly important for endovascular repair, and even more so with respect to Nguyen which discloses a rather large 20-24F sheath diameter for modern day transfemoral delivery where sheath size is closer to 14F ([0065] of Nguyen). When the modifications are significant, Applicant submits that it is not obvious to make such proposed modifications.

Greenhalgh discloses an outer graft/skirt with fibers extending therefrom. As such, adding the outer seal of Greenhalgh would add the outer skirt, the exact modification that Dwork teaches would require significant design changes to the stent design.

MODIFIED NGUYEN-GREENHALGH WOULD NOT BE SIZED AND SHAPED FOR ENDOVASCULAR DELIVERY THROUGH THE FEMORAL ARTERY BECAUSE THE BUNCHING ASSOCIATED WITH A STENT GRAFT OF GREENHAULGH WOULD CREATE TOO LARGE OF A DELIVERY PROFILE

A transcatheter valve stent frame is crimped or otherwise compressed within a catheter. This often causes the frame to have a crimped profile where bulging or bunching is observed of the stent frame. This is well-illustrated in FIG. 26c of Spenser.

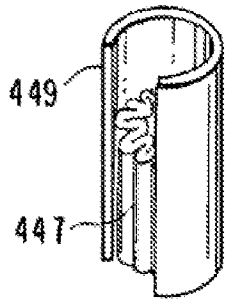


FIG.26c

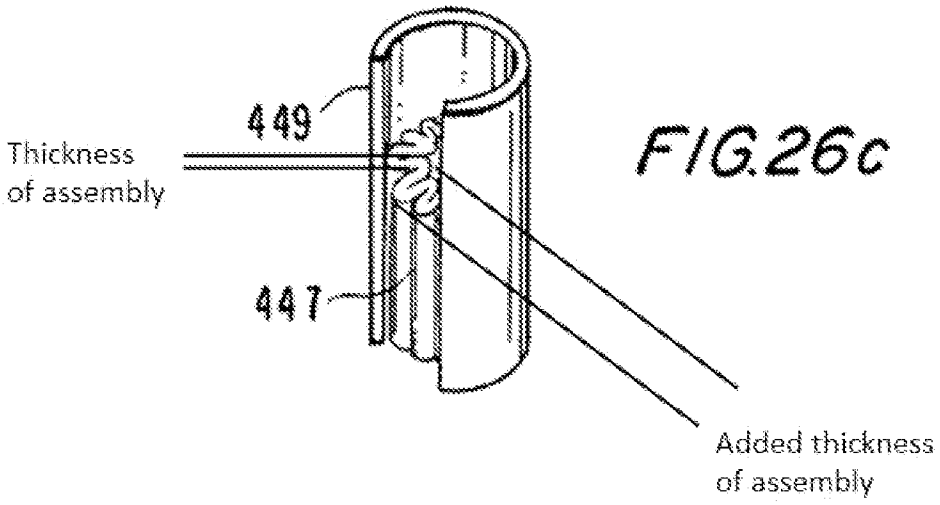
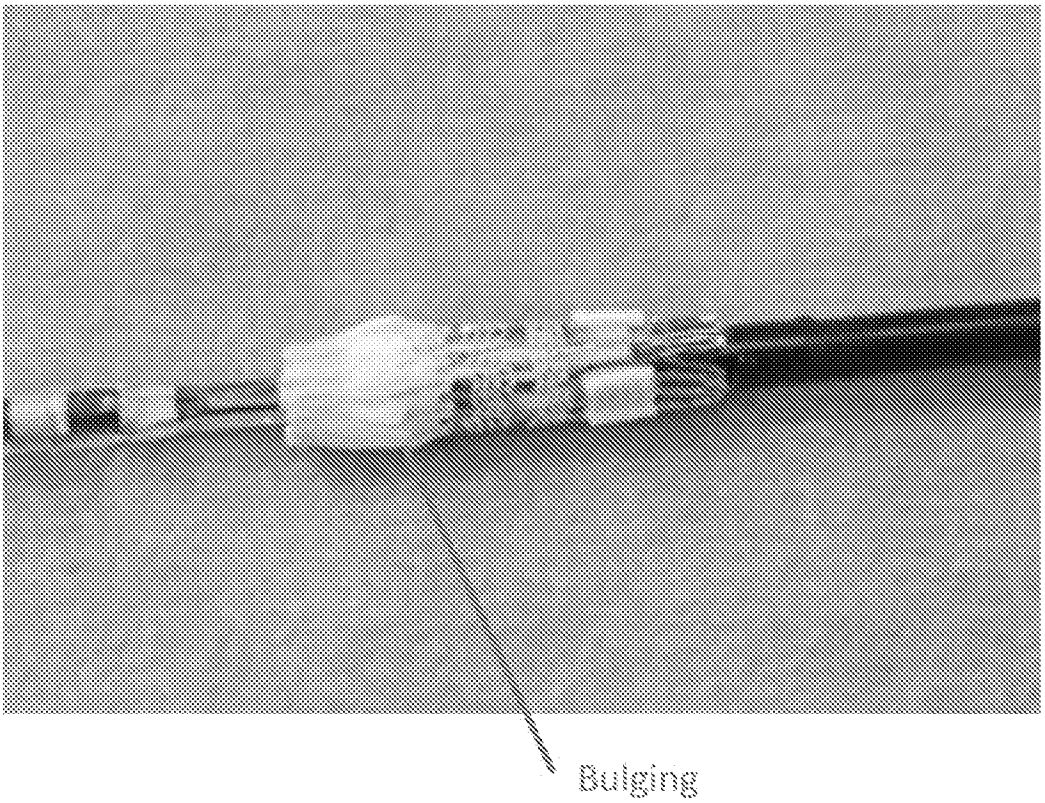


FIG.26c

(Annotations added by Patentee)

As illustrated, addition of an outer seal assembly that is coupled to the frame necessarily adds significantly to the crimp profile, and further restricts full crimping of the valve.

The commercial embodiment of Levi in the crimped profile illustrates the bunching or bulging concept well:



Thus, it is well-known that addition of an outer seal causes increases in crimp profile beyond just the thickness of the outer seal. Greenhalgh appears to teach a sealing assembly that includes a graft base that further includes fibers or other structures emanating therefrom.

FIG. 4 of Greenhalgh illustrates this construction:

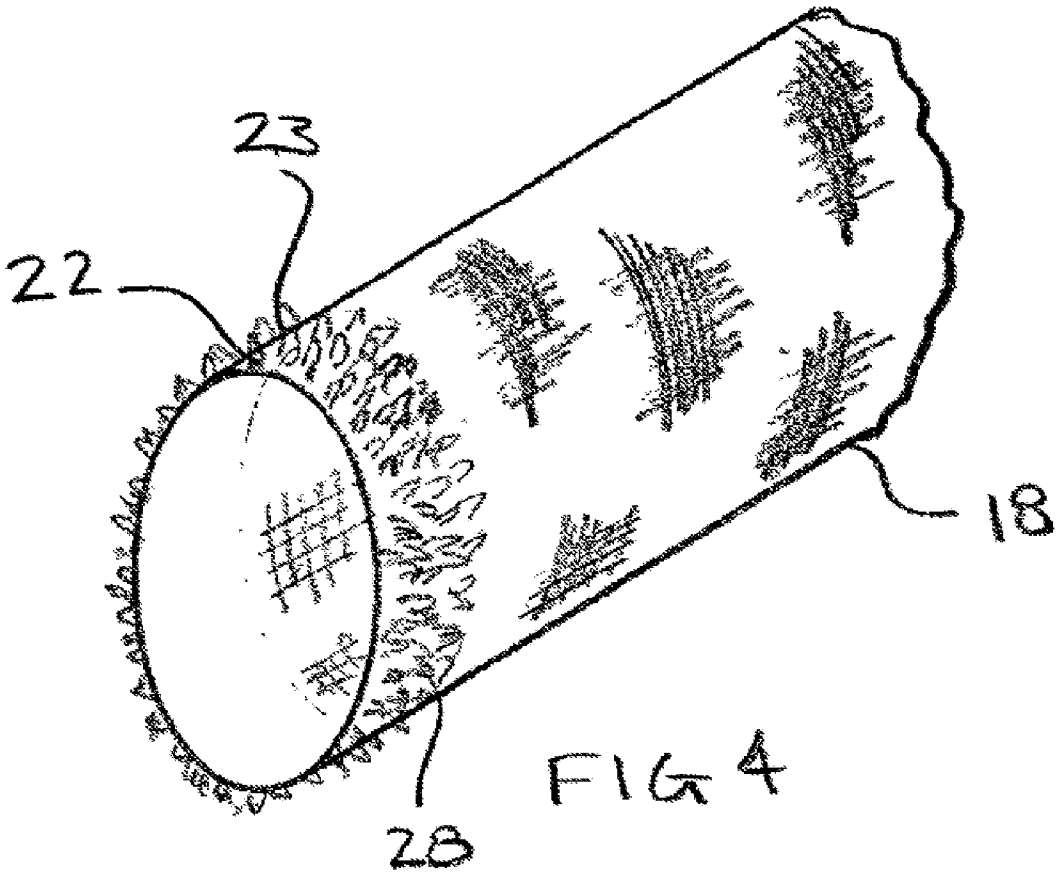


FIG 4

Greenhalgh describes substrate 18 as:

*[0027] As illustrated in FIG. 2, substrate **18** may be formed of interlaced filamentary members **24** and may be woven, knitted or braided. The term "filamentary member" as used herein is a generic term for a continuous strand or strands of fibers, yarns, filaments or material in a form suitable for knitting, weaving, braiding or otherwise intertwining or interlacing to form a fabric. Various forms of filamentary members include monofilaments, filaments twisted together, filaments laid together without twist, as well as other configurations.*

Additionally, Levi discloses that known fabric skirts such as those in Greenhalgh cannot be secured on the exterior of the frame in a "lay flat" position as claimed or else the valve frame cannot be crimped properly:

> *[0066] Known fabric skirts comprise a weave of warp and weft fibers that extend perpendicular to each other and with one set of fibers extending perpendicularly to the upper and lower edges of the skirt. When the metal frame, to which the fabric skirt is secured, is radially compressed, the overall axial length of the frame increases. Unfortunately, a fabric skirt, which inherently has limited elasticity, cannot elongate along with the frame and therefore tends to deform the struts of the frame and prevents uniform crimping.*

Therefore, addition of a stent graft such as Greenhalgh to a valve assembly likely creates a valve profile that is larger than a maximal 8mm crimp profile to be sized and shaped to be delivered endovascularly through the femoral artery, and further causes deformation of the struts of the frame and prevents uniform crimping.

Applicant submits that at least due to these concerns, one cannot modify Nguyen to include a stent graft as shown in Greenhalgh to arrive at the claimed invention.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any otherwise unpaid fees associated with the filing of this correspondence to Deposit Account No. **50-6191**.

Respectfully submitted,

Date: July 31, 2022

/Justin R. Nifong/
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Customer No. 115007

Electronic Acknowledgement Receipt

EFS ID:	46310070
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	31-JUL-2022
Filing Date:	12-APR-2022
Time Stamp:	18:17:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		426-2-25-UTIL-rsp-to-OA-dtd-7-21-2022-filed.pdf	946942 eb831cc64d5e0756109ae113e4f821de9c78ef27	yes	17

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Request for Reconsideration-After Non-Final Rejection	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	17
Warnings:			
Information:			
	Total Files Size (in bytes):	946942	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/719,160	Filing Date 04/12/2022	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/31/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 7	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/DESHONNE T. MARTINO-RAY/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 07/21/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER	
SHIPMON, TIFFANY P	

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
07/21/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

Office Action Summary	Application No. 17/719,160	Applicant(s) Shahriari, Ali	
	Examiner TIFFANY P SHIPMON	Art Unit 3774	AIA (FITF) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 09 May 2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

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

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 2 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 2 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Rejections - 35 USC § 103

2. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 2 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (WO 2006/124649; provided in a parent application 16/808,137) in view of Greenhalgh (US 2002/0052649).

4. Referring to claim 2, Nguyen et al. discloses a heart valve assembly comprising: a. an inner frame(skirt, 21) comprising a graft covering(page 8, lines 3-6) housing a prosthetic heart valve(14), wherein the graft covering extends around the prosthetic heart valve for providing sealing to the heart valve(see Figs. -6); b. an outer frame(12) formed from a metallic material(page 12, lines 6-9)and defining a gridded configuration(Fig.6), and being secured to the graft covering by a plurality of stitches(page 12, lines 1-6); and wherein the graft covering is made of polyester, polytetrafluoroethylene, expanded polytetrafluoroethylene, or a polymer(page 8, lines 3-6).

5. Nguyen et al. lacks a detailed description of a sealing material positioned externally to the outer frame for providing sealing between the outer frame and a patient's anatomical wall to prevent

paravalvular leaks, wherein the sealing material includes a plurality of radially extending fibers that extend outwardly of the outer frame.

6. Greenhalgh discloses a graft with a sealing material (Fig. 4, 23) positioned externally of the outer frame (See Fig. 4) for providing sealing between the outer frame and a patient's anatomical wall to prevent paravalvular leaks (Examiner considers this limitation to be that of intended use. Therefore, the claim is considered to be met when a prior art reference(s) teaches the structure limitation of having the sealing material positioned externally to the outer frame. The structure then would be fully capable of providing a sealing between the outer frame and a patient's anatomical wall to prevent paravalvular leaks), wherein the sealing material includes a plurality of radially extended fibers that extend outwardly of an outer frame(loops, 28).

7. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nguyen et al. to include a sealing material external to the outer frame that comprises extending fibers as taught in Greenhalgh in order to further improve the seal of the device once implanted and prevent leakage.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed.

Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

9. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 10,881,538. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

10. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 10,888,441. Although the claims at issue are not identical, they are not

patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

11. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 10,966,846. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

12. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-4 of U.S. Patent No. 10,987,236. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

13. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 10,792,172. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

14. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 10,857,011. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

15. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 11,026,817. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

16. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 11,129,735. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

17. Claim 2 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 11,045,335. Although the claims at issue are not identical, they are not patentably distinct from each other because they recite similar heart valve features with the claim of the present invention being slightly narrower in scope. Therefore, the present claims are encompassed by the recitation of the claims of granted patent.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIFFANY P SHIPMON whose telephone number is (571)270-1448. The examiner can normally be reached MONDAY-FRIDAY.

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

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Dieterle can be reached on 571-270-7872. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TIFFANY P SHIPMON/
Examiner, Art Unit 3774

/Jennifer Dieterle/
Supervisory Patent Examiner, Art Unit 3774

Notice of References Cited	Application/Control No. 17/719,160	Applicant(s)/Patent Under Reexamination Shahriari, Ali	
	Examiner TIFFANY P SHIPMON	Art Unit 3774	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20020052649-A1	05-2002	Greenhalgh, E. Skott	A61F2/0063	623/1.36
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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*	N	WO-2006124649-A2	11-2006	WO	KOMATSU S	A61F2/2412
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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/719,160	Shahriari, Ali
	Examiner	Art Unit
	TIFFANY P SHIPMON	3774

CPC - Searched*		
Symbol	Date	Examiner
A61F 2/856,07,2418,82,962,24,86,89,90; 2002/061067; 2210/00,0014,0057; 220/0008,0016,0025,0058,0075; 2230/001,0034,0067; 2250/0048,0069	07/13/2022	T.S.

CPC Combination Sets - Searched*		
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US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
Assignee/Inventor Search	07/13/2022	T.S,
EAST Search	07/13/2022	T.S.

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	
Attorney Docket Number	426/2/25 UTIL

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	
	Attorney Docket Number	426/2/25 UTIL

	1	NOTICE OF REQUISITION, CANADIAN PATENT OFFICE for CA Application No. 3,082,787 dated 8/24/2020
	2	Commissioner's Notice- Application Found Allowable, CANADIAN PATENT OFFICE for CA Application No. 3,082,787 dated 2/5/2021

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EXAMINER SIGNATURE

Examiner Signature	/TIFFANY P SHIPMON/	Date Considered	07/13/2022

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

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	
Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

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See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-06-24
Name/Print	Justin R. Nifong	Registration Number	59389

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
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L67	1	("7799072").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2019/02/05 09:42 AM
L68	6135	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L69	4276	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L70	3295	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L71	1674	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L72	1322	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L73	9150	L68 L69 L70 L71 L72	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/02/05 09:58 AM
L74	6389	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L75	4396	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L76	3436	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L77	1760	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L78	1352	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L79	9503	L74 L75 L76 L77 L78	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L80	9503	L74 L75 L76 L77 L78 L79	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/15 09:04 AM
L81	4461	L80 and (artery arteries)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/15 09:06 AM
L82	1118	L80 and (artery arteries) and (aortic near arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/15 09:09 AM

L83	6421	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L84	4413	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L85	3462	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L86	1773	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L87	1354	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L88	9549	L83 L84 L85 L86 L87	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L89	9549	L83 L84 L85 L86 L87 L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/04/29 11:05 AM
L90	1126	L89 and (artery arteries) and (aortic near arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/29 11:05 AM
L91	1	("20090254172").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2019/05/14 03:40 PM
L92	9	("20060155366"|"20100049313"|"6258117").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:09 AM
L93	2	("20080262592").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:10 AM
L94	6	("20070168013"|"20140172064"|"20140316513").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:10 AM
L95	6	("20020177890"|"5976179").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:10 AM
L96	3	"20140316513"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:19 AM
L97	2	"20070168013"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:20 AM
L98	4	"20140172065"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:21 AM
L99	6	"20100049313"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:26 AM
L100	2	"20060155366"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2019/07/21 10:29 AM

			JPO; DERWENT)				
L101	6666	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L102	4593	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L103	3601	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L104	1864	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L105	1380	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L106	9898	L101 L102 L103 L104 L105	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L107	9898	L101 L102 L103 L104 L105 L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/07/21 10:35 AM
L108	1179	L107 and (artery arteries) and (aortic near arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/07/21 10:35 AM
L109	4	"20070067014"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/07/21 11:44 AM
L110	4	"14614628"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/07/21 12:36 PM
L111	7098	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L112	4889	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L113	3856	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L114	1965	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L115	1422	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L116	10508	L111 L112 L113 L114 L115	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM
L117	10508	L111 L112 L113 L114 L115 L116	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/12/08 04:15 PM

L118	1256	L117 and (artery arteries) and (aortic near arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2019/12/08 04:15 PM
L120	7401	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L121	5076	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L122	4040	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L123	2043	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L124	1443	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L125	10919	L120 L121 L122 L123 L124	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L126	10919	L120 L121 L122 L123 L124 L125	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 11:45 AM
L127	1305	L126 and (artery arteries) and (aortic near arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2020/03/13 11:45 AM
L128	7401	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L129	5076	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L130	4040	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L131	2043	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L132	1443	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L133	10919	L128 L129 L130 L131 L132	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L134	10919	L128 L129 L130 L131 L132 L133	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:54 PM
L135	966	L134 and (stent and artery and seal$4 and arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 02:56 PM
L136	5500	A61F2/856.CPC.	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/03/13

			USOCR; FPRS; EPO; JPO; DERWENT)				07:01 PM
L137	24545	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:01 PM
L138	15139	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:01 PM
L139	16719	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:01 PM
L140	3555	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:01 PM
L141	11168	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:01 PM
L142	1881	(L136 L137 L138 L139 L140 L141) and (stent and artery and seal$4 and arch)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/03/13 07:02 PM
L143	1	("9044311").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/03/13 08:21 PM
L144	25	(US-10034784-$ | US-10065824-$ | US-16788806-$ | US-19857887-$ | US-20010044650-$ | US-20020082684-$ | US-20040249399-$ | US-20070219613-$ | US-20090036977-$ | US-20090099650-$ | US-20100087907-$ | US-20130013050-$ | US-3002816-$ | US-3025694-$ | US-3220613-$ | US-3289282-$ | US-3482228-$ | US-3506622-$ | US-3545549-$ | US-3562673-$ | US-3652198-$ | US-3715337-$ | US-3757263-$ | US-5464721-$ | US-5609627-$ | US-5773457-$ | US-5814752-$).DID.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/03/13 09:45 PM
L145	0	(DE-10065824-$ | DE-19857887-$ | AI-20010044650-$ | AI-20020082684-$ | AI-20040249399-$ | AI-	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/03/13 09:46 PM

		20070219613-$ | AI-20090036977-$ | AI-20090099650-$ | AI-20100087907-$ | AI-20130013050-$ | NO-2013040663-$ | NO-2013059596-$ | NO-2014072501-$ | BI-3482228-$ | VA-223131450-$).DID.					
L146	0	"16788806"	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/03/13 09:47 PM
L147	1	("20080132993").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/04/11 08:50 PM
L148	4	"20070067014"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 10:30 AM
L149	5	"20080132993"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 11:39 AM
L150	14	"13706896"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 12:11 PM
L151	1	"16788806"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 12:11 PM
L152	15	(US-10478320-$ | US-16788806-$ | US-20050010277-$ | US-20080082159-$ | US-20090264993-$ | US-3226814-$ | US-3402751-$ | US-3408731-$ | US-3574284-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 02:46 PM
L153	13	(US-16788806-$ | US-20040230287-$ | US-20080275548-$ | US-20110257731-$ | US-20120158121-$ | US-3125764-$ | US-3314328-$ | US-3668892-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 02:46 PM
L154	0	(AI-20040230287-$ | AI-20080275548-$ | AI-20110257731-$ | AI-20120158121-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/04/13 02:47 PM
L155	3758	623/1.12	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 02:43 PM
L156	51	L155 and ((fibers with collagen))	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 02:43 PM
L157	7650	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO;	OR	OFF	OFF	2020/06/06 02:43 PM

			DERWENT)				
L158	5220	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 02:43 PM
L159	4196	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 02:43 PM
L160	2120	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 02:43 PM
L161	1463	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 02:43 PM
L162	11262	L157 L158 L159 L160 L161	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 02:44 PM
L163	282	L162 and ((fibers with collagen))	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 02:44 PM
L164	1	"20040256759"	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 03:28 PM
L165	119	(US-10028848-$ | US-10034784-$ | US-10065824-$ | US-10321985-$ | US-16808137-$ | US-18153473-$ | US-19857887-$ | US-2858390-$ | US-20010044650-$ | US-20020082684-$ | US-20020177890-$ | US-20030040771-$ | US-20040210304-$ | US-20040249399-$ | US-20050043790-$ | US-20050197687-$ | US-20060149351-$ | US-20060155366-$ | US-20070067014-$ | US-20070095283-$ | US-20070168013-$ | US-20070203559-$ | US-20070219613-$ | US-20070250146-$ | US-20070276464-$ | US-20080132993-$ | US-20080132999-$ | US-20080262592-$ | US-20080275548-$ | US-20090036977-$ | US-20090099644-$ | US-20090099650-$ | US-20090125098-$ | US-20090171456-$ | US-20090198315-$ | US-	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 04:05 PM

		20090312834-$ | US- 20100042202-$ | US- 20100049313-$ | US- 20100087907-$ | US- 20100094409-$ | US- 20110257731-$ | US- 20120046726-$ | US- 20120089218-$ | US- 20130013050-$ | US- 20130144373-$ | US- 20140046428-$ | US- 20140172064-$ | US- 20140316513-$ | US- 20140336749-$ | US- 20160022450-$ | US- 20160270935-$ | US- 20170209254-$ | US- 2787925-$ | US- 3002816-$ | US- 3002826-$ | US- 3005270-$ | US- 3016877-$ | US- 3021408-$ | US- 3025694-$ | US- 3034007-$ | US- 3095343-$ | US- 3102417-$ | US- 3114001-$ | US- 3157174-$ | US- 3179931-$ | US- 3206438-$ | US- 3220613-$ | US- 3220899-$ | US- 3226710-$ | US- 3258117-$ | US- 3269739-$ | US- 3289282-$ | US- 3314324-$ | US- 3358140-$ | US- 3393021-$ | US- 3393136-$ | US- 3394119-$ | US- 3397355-$ | US- 3398701-$ | US- 3414635-$ | US- 3419788-$ | US- 3425584-$ | US- 3452070-$ | US- 3482228-$ | US- 3506622-$ | US- 3545549-$ | US- 3561102-$ | US- 3562673-$ | US- 3582462-$ | US- 3603156-$ | US- 3617234-$ | US- 3623067-$ | US- 3629739-$ | US-					

		3652198-$ | US-3715317-$ | US-3715337-$ | US-3721676-$ | US-3757263-$ | US-3833341-$ | US-3864808-$ | US-3911490-$ | US-3940040-$ | US-3943427-$ | US-3976179-$ | US-5004346-$ | US-5061275-$ | US-5254632-$ | US-5334868-$ | US-5464721-$ | US-5609627-$ | US-5716393-$ | US-5718159-$ | US-5752829-$ | US-5773457-$ | US-5814752-$ | US-5918925-$ | US-5957974-$ | US-7018404-$ | US-7771467-$ | US-7799072-$ | US-7914569-$ | US-D187180-$).DID.					
L166	15	(DE-10065824-$ | DN-102014805-$ | DE-19857887-$ | AI-20010044650-$ | AI-20020082684-$ | AI-20020177890-$ | AI-20030040771-$ | AI-20040210304-$ | AI-20040249399-$ | NO-2004089249-$ | AI-20050043790-$ | AI-20050197687-$ | NO-2005087117-$ | AI-20060149351-$ | AI-20060155366-$ | NO-2006127412-$ | AI-20070067014-$ | AI-20070095283-$ | AI-20070168013-$ | AI-20070203559-$ | AI-20070219613-$ | AI-20070250146-$ | AI-20070276464-$ | AI-20080132993-$ | AI-20080132999-$ | AI-20080262592-$ | AI-20080275548-$ | AI-20090036977-$ | AI-20090099644-$ | AI-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT)	OR	OFF	OFF	2020/06/06 04:05 PM

		20090099650-$ | AI-20090125098-$ | AI-20090171456-$ | AI-20090198315-$ | AI-20090312834-$ | AI-20100042202-$ | AI-20100049313-$ | NO-2010006627-$ | AI-20100087907-$ | AI-20100094409-$ | NO-2010031060-$ | NO-2010105195-$ | AI-20110257731-$ | NO-2011035154-$ | JP-2011502628-$ | JP-2011507658-$ | AI-20120046726-$ | AI-20120089218-$ | NO-2012147675-$ | AI-20130013050-$ | AI-20130144373-$ | NO-2013040663-$ | NO-2013059596-$ | NO-2013086132-$ | AI-20140046428-$ | AI-20140172064-$ | AI-20140316513-$ | AI-20140336749-$ | NO-2014072501-$ | AI-20160022450-$ | AI-20160270935-$ | AI-20170209254-$ | EP-2787925-$ | BI-3482228-$ | BI-3582462-$ | BI-5254632-$ | BI-5334868-$ | JS-2012068165-$).DID.				
L167	34	(US-16808137-$ | US-20020052649-$ | US-20040243221-$ | US-20040256759-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20090105805-$ | US-20100204781-$ | US-20120123529-$ | US-20120296418-$ | US-20130090729-$ | US-3370418-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT)	OR	OFF	OFF	2020/06/06 04:07 PM
L168	1	(AI-20020052649-$ | AI-	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/06/06

		20040243221-$ | AI-20040256759-$ | JP-2005124959-$ | NO-2006005015-$ | AI-20070179591-$ | AI-20070213815-$ | AI-20070219620-$ | AI-20080021547-$ | AI-20090105805-$ | AI-20100204781-$ | AI-20120123529-$ | AI-20120296418-$ | AI-20130090729-$ | VA-223131450-$).DID.	USOCR; FPRS; EPO; DERWENT)				04:07 PM
L169	6	((frame with (inner and outer) same seal$4) same graft) and (heart with valve)	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 04:53 PM
L170	7	((frame same (inner and outer) same seal$4) same graft) and (heart with valve)	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/06/06 05:50 PM
L171	1	("9370419").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/06 07:30 PM
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L173	171	L172 and fiber$4	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/06 07:32 PM
L174	3550	a61f2/2409.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/06 09:44 PM
L175	3550	a61f2/2409.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/07 10:04 AM
L176	1905	L175 and (seal$4)	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/07 10:04 AM
L180	1	("20130144373").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 09:48 AM
L181	3557	a61f2/2409.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:52 AM
L182	7673	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L183	5229	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L184	4210	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L185	2127	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM

L186	1467	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L187	11297	L182 L183 L184 L185 L186	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L188	2885	L181 and L187	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 09:59 AM
L189	1	("7799072").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 10:48 AM
L190	4	"16736879"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 01:27 PM
L191	1	("20170014228").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 02:00 PM
L192	182	(US-10028848-$ | US-10321985-$ | US-16736879-$ | US-20020177890-$ | US-20030040771-$ | US-20040210304-$ | US-20050043790-$ | US-20050197687-$ | US-20060149351-$ | US-20060155366-$ | US-20070067014-$ | US-20070095283-$ | US-20070168013-$ | US-20070203559-$ | US-20070250146-$ | US-20070276464-$ | US-20080132993-$ | US-20080132999-$ | US-20080262592-$ | US-20080275548-$ | US-20090099644-$ | US-20090125098-$ | US-20090171456-$ | US-20090198315-$ | US-20090312834-$ | US-20100042202-$ | US-20100049313-$ | US-20100094409-$ | US-20110257731-$ | US-20120046726-$ | US-20120089218-$ | US-20130144373-$ | US-20140046428-$ | US-20140172064-$ | US-20140316513-$ | US-20140336749-$ | US-20160022450-$ | US-20160270935-$ | US-20170209254-$ | US-3002826-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 02:36 PM

		3005270-$ | US- 3016877-$ | US- 3021408-$ | US- 3034007-$ | US- 3095343-$ | US- 3102417-$ | US- 3114001-$ | US- 3157174-$ | US- 3179931-$ | US- 3206438-$ | US- 3220899-$ | US- 3226710-$ | US- 3258117-$ | US- 3269739-$ | US- 3314324-$ | US- 3358140-$ | US- 3393021-$ | US- 3393136-$ | US- 3394119-$ | US- 3397355-$ | US- 3398701-$ | US- 3414635-$ | US- 3419788-$ | US- 3425584-$ | US- 3452070-$ | US- 3561102-$ | US- 3582462-$ | US- 3603156-$ | US- 3617234-$ | US- 3623067-$ | US- 3629739-$ | US- 3715317-$ | US- 3721676-$ | US- 3833341-$ | US- 3864808-$ | US- 3911490-$ | US- 3940040-$ | US- 3943427-$ | US- 3976179-$ | US- 5004346-$ | US- 5061275-$ | US- 5254632-$ | US- 5334868-$ | US- 5716393-$ | US- 5718159-$ | US- 5752829-$ | US- 5918925-$ | US- 5957974-$ | US- 7018404-$ | US- 7771467-$ | US- 7799072-$ | US- 7914569-$).DID.				
L193	0	(AI-20020177890-$ | AI-20030040771-$ | AI-20040210304-$ | NO-2004089249-$ | AI-20050043790-$ | AI-20050197687-$ | AI-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 02:37 PM

		20060149351-$ | AI-20060155366-$ | AI-20070067014-$ | AI-20070095283-$ | AI-20070168013-$ | AI-20070203559-$ | AI-20070250146-$ | AI-20070276464-$ | AI-20080132993-$ | AI-20080132999-$ | AI-20080262592-$ | AI-20080275548-$ | AI-20090099644-$ | AI-20090125098-$ | AI-20090171456-$ | AI-20090198315-$ | AI-20090312834-$ | AI-20100042202-$ | AI-20100049313-$ | AI-20100094409-$ | AI-20110257731-$ | AI-20120046726-$ | AI-20120089218-$ | NO-2012147675-$ | AI-20130144373-$ | NO-2013086132-$ | AI-20140046428-$ | AI-20140172064-$ | AI-20140316513-$ | AI-20140336749-$ | AI-20160022450-$ | AI-20160270935-$ | AI-20170209254-$ | BI-3582462-$ | BI-5254632-$ | BI-5334868-$).DID.					
L194	6	(US-12854807-$ | US-16735541-$ | US-16736879-$ | US-16743828-$ | US-18153473-$ | US-2858390-$ | US-2787925-$ | US-D187180-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 02:37 PM
L195	10	(CN-102014805-$ | NO-2005087117-$ | NO-2006127412-$ | NO-2010006627-$ | NO-2010031060-$ | NO-2010105195-$ | NO-2011035154-$ | JP-2011502628-$ | JP-2011507658-$ | EP-2787925-$ | JS-2012068165-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 02:37 PM
L196	50	(US-10034784-$ | US-	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/06/17

		10065824-$ | US-16736879-$ | US-19857887-$ | US-20010044650-$ | US-20020082684-$ | US-20040249399-$ | US-20070219613-$ | US-20090036977-$ | US-20090099650-$ | US-20100087907-$ | US-20130013050-$ | US-3002816-$ | US-3025694-$ | US-3220613-$ | US-3289282-$ | US-3482228-$ | US-3506622-$ | US-3545549-$ | US-3562673-$ | US-3652198-$ | US-3715337-$ | US-3757263-$ | US-5464721-$ | US-5609627-$ | US-5773457-$ | US-5814752-$).DID.	USOCR; FPRS; EPO; JPO; DERWENT)				02:41 PM
L197	8	(DE-10065824-$ | DE-19857887-$ | AI-20010044650-$ | AI-20020082684-$ | AI-20040249399-$ | AI-20070219613-$ | AI-20090036977-$ | AI-20090099650-$ | AI-20100087907-$ | AI-20130013050-$ | NO-2013040663-$ | NO-2013059596-$ | NO-2014072501-$ | BI-3482228-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 02:41 PM
L198	914	("20010001314" | "20010002445" | "20010007956" | "20010010017" | "20010011189" | "20010021872" | "20010025196" | "20010032013" | "20010039450" | "20010041928" | "20010044647" | "20010049555" | "20020010508" | "20020029014" | "20020032480" | "20020032481" |	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 03:05 PM

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L199	170	(rowe.in.) and stent	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:19 PM
L200	75	(mclean.in.) and stent	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:22 PM
L201	108	(vidlund.in.) and stent	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:23 PM
L202	1	("20080275548").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:47 PM
L203	1	("20120283820").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:48 PM
L204	1050	salahieh.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 04:48 PM
L205	516	salahieh.in. and valve	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/06/17 04:48 PM
L206	1	("20050137695").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/06/17 04:55 PM
L207	7776	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/20 11:59 AM
L208	5285	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/20 11:59 AM
L209	4260	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/20 11:59 AM
L210	2147	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/20 11:59 AM
L211	1470	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/20 11:59 AM
L212	11433	L207 L208 L209 L210 L211	(US-PGPUB; USPAT; EPO; JPO;	OR	OFF	OFF	2020/07/20 11:59 AM

			DERWENT)				
L215	56	2006/124649	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 09:23 AM
L216	0	wo2006/124649	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 09:23 AM
L217	0	(2006/124649).CCLS.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/07/29 09:23 AM
L218	0	(2006/0124649).CCLS.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/07/29 09:24 AM
L219	5	("2006124649").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT)	OR	OFF	OFF	2020/07/29 09:24 AM
L220	1	"16808137"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 09:55 AM
L221	4	"20090125098"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 11:29 AM
L222	7	"20030040771"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 11:30 AM
L223	1779	(cuff with (fiber barb))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/07/29 11:58 AM
L224	270	("20020036220" | "20030023303" | "20030050694" | "20030130726" | "20040049262" | "20040093075" | "20040102837" | "20040111111" | "20040210304" | "20040260389" | "20050096726" | "20050137682" | "20050137695" | "20050137697" | "20050203605" | "20050256566" | "20060008497" | "20060020327" | "20060025857" | "20060036308" | "20060074484" | "20060122692" | "20060149360" | "20060161249" | "20060173532" | "20060178740" | "20060206202" | "20060241744" |	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/07/29 12:03 PM

		"20060241745" | "20060259120" | "20060259136" | "20060259137" | "20060265056" | "20060276813" | "20060276874" | "20070010876" | "20070027534" | "20070043435" | "20070055358" | "20070067029" | "20070093890" | "20070100435" | "20070118210" | "20070213813" | "20070233228" | "20070244545" | "20070244552" | "20070288087" | "20080021552" | "20080039934" | "20080071369" | "20080082164" | "20080097595" | "20080114452" | "20080125853" | "20080140189" | "20080147183" | "20080154355" | "20080154356" | "20080243245" | "20080255662" | "20080262602" | "20080269879" | "20090099653" | "20090112309" | "20090138079" | "20090276027" | "20100004740" | "20100036484" | "20100049306" | "20100087907" | "20100131055" | "20100168778" | "20100168839" | "20100168844" | "20100185277" | "20100191326" | "20100204781" | "20100204785" | "20100217382" | "20100234940" | "20100249911" | "20100249923" | "20100286768" | "20100298931" | "20110029072"				

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L225	1	(spense.in.) and valve	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/07/29 12:22 PM
L226	573	(spence.in.) and valve	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/07/29 12:22 PM

L227	10	(US-20070288087-$ | US-20100217382-$ | US-20100249916-$ | US-20120123529-$ | US-20200197199-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/04 10:17 AM
L228	16	(US-3370418-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-7175652-$ | US-7470284-$ | US-7740656-$ | US-7972370-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/04 10:19 AM
L229	34	(US-16910189-$ | US-20020052649-$ | US-20040243221-$ | US-20040256759-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20090105805-$ | US-20100204781-$ | US-20120123529-$ | US-20120296418-$ | US-20130090729-$ | US-3370418-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/04 10:19 AM
L230	5	(AI-20020052649-$ | AI-20040243221-$ | AI-20040256759-$ | JP-2005124959-$ | WO-2006005015-$ | AI-20070179591-$ | AI-20070213815-$ | AI-20070219620-$ | AI-20080021547-$ | AI-20090105805-$ | AI-20100204781-$ | AI-20120123529-$ | AI-20120296418-$ | AI-20130090729-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/04 10:20 AM
L231	7889	a61f2/2418.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM
L232	5349	a61f2/2412.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM
L233	4324	a61f2/2436.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM

L234	2182	a61f2/2433.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM
L235	1479	a61f2/2475.cpc.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM
L236	11602	L231 L232 L233 L234 L235	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:53 PM
L237	22	L236 and ((fibers with collagen) same migration)	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:54 PM
L238	1634	L236 and ((fibers))	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:55 PM
L239	1688	L236 and ((fibers))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:55 PM
L240	332	L236 and ((fibers)) and (frame and graft)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/08/28 03:55 PM
L245	4	(US-10716662-$ | US-16910189-$ | US-20090143855-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/09/27 11:02 PM
L246	3	(wO-2001049213-$ | wO-2004032987-$ | AI-20090143855-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/09/27 11:04 PM
L247	361	"4164046"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/09/27 11:09 PM
L248	1	("4164046").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/09/27 11:09 PM
L249	1	("20070142907").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/09/27 11:11 PM
L256	85	(shahriari near ali).in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 02:07 PM
L257	51	"2006124649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 03:17 PM
L258	0	("2006124649").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/11/06 03:17 PM
L259	25	"12882605"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 04:02 PM
L260	0	"12882605.app"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 04:03 PM
L261	0	"12882605".app.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 04:03 PM
L262	0	("12882605").PN.	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/11/06

			USOCR)				04:03 PM
L263	0	("2006018514").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/11/06 04:03 PM
L264	1	("20060018514").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2020/11/06 04:03 PM
L265	7	"20060018514"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 04:04 PM
L266	30	"2006018514"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 04:04 PM
L267	16	(US-10716662-$ | US-17024060-$ | US-20070288087-$ | US-20090143855-$ | US-20100217382-$ | US-20100249916-$ | US-20120123529-$ | US-20200197199-$ | US-3992608-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 07:25 PM
L268	0	("(NO-2001049213-$\|NO-2004032987-$|AI-20070288087-$\|AI-20090143855-$|AI-20100217382-$\|AI-20100249916-$|NO-2011069048-$\|AI-20120123529-$|AI-20200197199-$\|VA-223131450-$).DID.").PN.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2020/11/06 07:25 PM
L269	0	(WO-2001049213-$ | NO-2004032987-$ | AI-20070288087-$ | AI-20090143855-$ | AI-20100217382-$ | AI-20100249916-$ | NO-2011069048-$ | AI-20120123529-$ | AI-20200197199-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2020/11/06 07:26 PM
L272	14	(US-10792172-$ | US-17096253-$ | US-20040082989-$ | US-20040256759-$ | US-20120123529-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:22 AM
L273	9	(US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | US-20120123529-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:23 AM

L274	23	(US-10792172-$ | US-17096253-$ | US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:24 AM
L275	21	(US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | WO-2006124649-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:25 AM
L276	5725	A61F2/856.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:26 AM
L277	26012	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:26 AM
L278	17240	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:26 AM
L279	17642	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:26 AM
L280	3934	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L281	5886	A61F2/24.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L282	7416	A61F2/86.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L283	11668	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L284	18724	A61F2/90.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L285	5565	A61F2002/061.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L286	4782	A61F2002/067.CPC.	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/01/16

			USOCR; FPRS; EPO; JPO; DERWENT)				10:27 AM
L287	535	A61F2210/00.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:27 AM
L288	12232	A61F2210/0014.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L289	1710	A61F2210/0057.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L290	11758	A61F2220/0008.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L291	15314	A61F2220/0016.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L292	32596	A61F2220/0025.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L293	9253	A61F2220/0058.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L294	17878	A61F2220/0075.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:28 AM
L295	3437	A61F2230/001.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:29 AM
L296	3130	A61F2230/0034.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:29 AM
L297	14644	A61F2230/0067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:29 AM
L298	1594	A61F2250/0048.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:29 AM
L299	3931	A61F2250/0069.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:29 AM
L300	2511	(L272 L273 L274 L275 L276 L277 L278 L279 L280 L281 L282 L283 L284 L285 L286 L287 L288 L289 L290 L291 L292 L293 L294 L295 L296 L297 L298 L299) and (heart adj3 valve) and (fiber$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:31 AM
L301	1676	L300 and (seal$4)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 10:33 AM

L302	48	((("SHAHRIARI") near3 ("Ali"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/16 11:48 AM
L303	13	((("AORTIC") near3 ("INNOVATIONS") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	OFF	OFF	2021/01/16 11:49 AM
L304	13	(US-10258464-$ | US-20110218619-$ | US-20110319991-$ | US-3339377-$ | US-3408214-$ | US-3532868-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/26 05:20 PM
L305	2	(US-20120123529-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/26 05:21 PM
L306	4	"16910189"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/26 06:34 PM
L307	2	"17060557"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/01/26 06:35 PM
L309	8	(US-10792172-$ | US-20020052649-$ | US-3333075-$ | US-3370418-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:46 PM
L310	3	(("9333075") or ("7921678") or ("9370418")).PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/02/11 05:48 PM
L311	15	(US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:48 PM
L312	0	("(us-20130304196-$).DID.").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/02/11 05:49 PM
L313	2	(us-20130304196-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:49 PM
L315	1	("20120123529").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/02/11 05:50 PM
L317	0	(AI-20020052649-$ | AI-20060276813-$ | AI-20080077236-$ | AI-20080188929-$ | AI-20080319521-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:51 PM
L318	10	(US-20020052649-$ | US-20060276813-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:52 PM

L319	2	(US-20110009948-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:54 PM
L320	5	"20060005015"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:55 PM
L321	96	"2006005015"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/11 05:55 PM
L322	5	"15876053"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:11 AM
L323	2	("2018/0206982").URPN.	(USPAT)	OR	OFF	OFF	2021/02/13 09:12 AM
L324	0	"20010049555"	(USPAT)	OR	OFF	OFF	2021/02/13 09:14 AM
L325	4	"20010049555"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:14 AM
L326	3	"20070233228"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:16 AM
L327	3	"20120296418"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:16 AM
L328	822	("20010021872"|"20020026094"|"20020032481"|"20020138135"|"20020173842"|"20030050694"|"20030100939"|"20030158597"|"20030212454"|"20040039436"|"20040186563"|"20040186565"|"20050075728"|"20050096736"|"20050188525"|"20050203614"|"20050203617"|"20050234546"|"20060004469"|"20060025857"|"20060058872"|"20060149350"|"20060183383"|"20060229719"|"20060259137"|"20070005131"|"20070010876"|"20070010877"|"20070112422"|"20070162102"|"20070203503"|"20070203575"|"20070203576"|"20070213813"|"20070260305"|"20070265700"|"20080114442"|"20080125853"|"20080154355"|"20080183271"|"20090125118"|"20090157175"|"20090276040"|"2009028161	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:25 AM

		9"|"20090299452"|"200 90319037"|"201000493 13"|"20100168844"|"20 100198347"|"20100204 781"|"20110015729"|"2 0110319991"|"2012025 9409"|"20130023985"|" 20130190857"|"201302 74873"|"20130310926"| "20130317598"|"20130 331929"|"20140194981 "|"20140200661"|"2014 0209238"|"2014027741 7"|"20140277419"|"201 40277424"|"201403303 72"|"20140343671"|"20 150073545"|"20150073 546"|"3409013"|"35484 17"|"3587115"|"365774 4"|"3671979"|"3714671" |"3755823"|"4035849"|" 4056854"|"4106129"|"4 222126"|"4265694"|"42 97749"|"4339831"|"434 3048"|"4345340"|"4373 216"|"4406022"|"44412 16"|"4470157"|"453548 3"|"4574803"|"4592340" |"4605407"|"4612011"|" 4643732"|"4655771"|"4 692164"|"4733665"|"47 59758"|"4762128"|"477 7951"|"4787899"|"4787 901"|"4796629"|"48202 99"|"4829990"|"485100 1"|"4856516"|"4878495" |"4878906"|"4883458"|" 4922905"|"4966604"|"4 979939"|"4986830"|"49 94077"|"5007896"|"502 6366"|"5032128"|"5037 434"|"5047041"|"50591 77"|"5080668"|"508563 5"|"5089015"|"5152771" |"5163953"|"5167628"|" 5192297"|"5266073"|"5 282847"|"5295958"|"53 32402"|"5360444"|"537 0685"|"5397351"|"5411 055"|"5411552"|"54434 46"|"5480424"|"550001 4"|"5545209"|"5545214" |"5549665"|"5554185"|" 5558644"|"5571175"|"5 584803"|"5591185"|"55 91195"|"5607464"|"560 9626"|"5628792"|"5639 274"|"5665115"|"57164					

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L329	4	("20130190862"|"20160317305").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:26 AM
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L331	835	("20020173842"|"20030100939"|"20040186563"|"20050203617"|"20070162102"|"20080183271"|"20100204781"|"20130274873"|"20140200661"|"20150073546"|"4222126"|"4733665"|"4759758"|"4777951"|"5026366"|"5032128"|"5332402"|"5411055"|"5558644"|"5571175"|"5609626"|"6231602"|"6425916"|"6440764"|"6689123"|"6	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 09:27 AM

		893460"|"6936067"|"76 55034"|"7993394"|"865 2203"|"20030212454"|" 20050075728"|"200701 12422"|"20100168844"| "20100198347"|"48299 90"|"5397351"|"554521 4"|"5549665"|"5584803" |"5855602"|"6027525"|" 6132473"|"6168614"|"6 221091"|"6302906"|"63 50277"|"6454799"|"660 5112"|"6908481"|"7510 575"|"7563280"|"20070 233228"|"20020138135 "|"20050203614"|"2005 0234546"|"2006014935 0"|"20070260305"|"371 4671"|"4297749"|"4441 216"|"4692164"|"47621 28"|"4883458"|"499407 7"|"5007896"|"5163953" |"5360444"|"5411552"|" 5591185"|"5639274"|"5 665115"|"5716417"|"57 49890"|"5756476"|"585 5601"|"6171335"|"6245 102"|"6299637"|"64887 04"|"6569196"|"676916 1"|"7393360"|"7585321" |"7959672"|"8167932"|" 8747463"|"9078781"|"2 0130190862"|"2001004 9555"|"20040186565"|" 20060058872"|"200602 29719"|"20070213813"| "20090299452"|"20120 259409"|"20130023985 "|"20130310926"|"2013 0317598"|"2013033192 9"|"20140209238"|"201 40277417"|"201403436 71"|"4265694"|"433983 1"|"4373216"|"4470157" |"4592340"|"4643732"|" 4796629"|"4820299"|"4 856516"|"4966604"|"50 47041"|"5089015"|"526 6073"|"5295958"|"5591 195"|"5607464"|"59579 49"|"6716244"|"676736 2"|"7018406"|"7096554" |"7276084"|"7374571"|" 8029556"|"2002002609 4"|"20050096736"|"200 60259137"|"200700051 31"|"20090125118"|"20 090157175"|"20090319					

		037"|"20110319991"|"20140194981"|"20140277424"|"3587115"|"3657744"|"3671979"|"4343048"|"4612011"|"4787899"|"4787901"|"4878495"|"4878906"|"4979939"|"4986830"|"5059177"|"5085635"|"5152771"|"5370685"|"5500014"|"5554185"|"5728068"|"6210408"|"6352547"|"6527979"|"6783542"|"7618446"|"20030050694"|"20030158597"|"20050188525"|"20060004469"|"20070203503"|"20080114442"|"20080154355"|"20100049313"|"20110015729"|"20140277419"|"20150073545"|"3409013"|"3548417"|"4035849"|"4056854"|"4106129"|"4406022"|"4535483"|"4922905"|"5037434"|"5080668"|"5282847"|"5769812"|"5840081"|"5855597"|"6174327"|"6458153"|"6468660"|"6652578"|"6830584"|"6878162"|"7018408"|"7225518"|"7785366"|"8454685"|"20120296418"|"20010021872"|"20040039436"|"20070010877"|"20070265700"|"20080125853"|"20090281619"|"20130190857"|"20140330372"|"4345340"|"4605407"|"5545209"|"5628792"|"6217585"|"6461382"|"6730118"|"7318278"|"7462191"|"7618447"|"8449606"|"20170014229"|"20020032481"|"20060025857"|"20060183383"|"20070010876"|"20070203575"|"20070203576"|"20090276040"|"3755823"|"4574803"|"4655771"|"4851001"|"5167628"|"5192297"|"5443446"|"5480424"|"5800508"|"5925063"|"6482228"|"6582462"|"6733525"|"7276078"|"8291570"|"20160317305").PN.				
L332	11	WO2006124649	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/02/13

			USOCR; FPRS; EPO; JPO; DERWENT)				10:13 AM
L333	53	"2006124649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 10:14 AM
L334	0	"17131869"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 11:12 AM
L335	2	"17060557"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 11:12 AM
L336	13	L328 and (outer$4 with (graft))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 11:49 AM
L337	27	L328 and ((outer$4 exter$4 outsid$$)with (graft))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 12:00 PM
L338	36075	l11and ((outer$4 exter$4 outsid$$)with (graft))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 12:14 PM
L339	27	L331 and ((outer$4 exter$4 outsid$$)with (graft))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 12:14 PM
L340	13	(US-10258464-$ | US-20110218619-$ | US-20110319991-$ | US-3339377-$ | US-3408214-$ | US-3532868-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 12:56 PM
L341	12	(US-20020052649-$ | US-20060276813-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-3333075-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 12:57 PM
L342	4	"20110098802"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/13 03:10 PM
L343	1	("9333075").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/02/17 05:33 AM
L344	10	(US-20020052649-$ | US-20060276813-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/02/17 05:40 AM
L345	70	(US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17007373-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 12:07 PM

		20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100204781-$ | US-20110009948-$ | US-20110098802-$ | US-20110218619-$ | US-20110319991-$ | US-20120123529-$ | US-20120296418-$ | US-20130304196-$ | US-3333075-$ | US-3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.					
L346	10	"16808137"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 02:38 PM
L347	34	"10555823"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 02:50 PM
L348	2	"16983196"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 03:15 PM
L349	1	("10881538").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/03/21 03:20 PM
L350	14	(US-10792172-$ | US-17096253-$ | US-20040082989-$ | US-20040256759-$ | US-20120123529-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L351	9	(US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | US-20120123529-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L352	23	(US-10792172-$ | US-17096253-$ | US-20020052649-$ | US-20030153974-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM

		20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.					
L353	21	(US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | WO-2006124649-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L354	5771	A61F2/856.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L355	26423	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L356	17810	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L357	17863	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L358	4039	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L359	6081	A61F2/24.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L360	7540	A61F2/86.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L361	11779	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L362	18985	A61F2/90.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L363	5683	A61F2002/061.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L364	4850	A61F2002/067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L365	554	A61F2210/00.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2021/03/21 06:03 PM

			JPO; DERWENT)				
L366	12658	A61F2210/0014.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L367	1774	A61F2210/0057.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L368	12050	A61F2220/0008.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L369	15676	A61F2220/0016.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L370	32778	A61F2220/0025.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L371	9317	A61F2220/0058.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L372	18227	A61F2220/0075.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L373	3573	A61F2230/001.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L374	3174	A61F2230/0034.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L375	14799	A61F2230/0067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L376	1655	A61F2250/0048.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L377	4153	A61F2250/0069.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 06:03 PM
L378	14	(US-10792172-$ | US-17096253-$ | US-20040082989-$ | US-20040256759-$ | US-20120123529-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L379	9	(US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | US-20120123529-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L380	23	(US-10792172-$ | US-17096253-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2021/03/21 09:13 PM

		20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	JPO; DERWENT)				
L381	21	(US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | WO-2006124649-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L382	5771	A61F2/856.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L383	26423	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L384	17810	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L385	17863	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L386	4039	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L387	6081	A61F2/24.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L388	7540	A61F2/86.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L389	11779	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L390	18985	A61F2/90.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L391	5683	A61F2002/061.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L392	4850	A61F2002/067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM

L393	554	A61F2210/00.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L394	12658	A61F2210/0014.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L395	1774	A61F2210/0057.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L396	12050	A61F2220/0008.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L397	15676	A61F2220/0016.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L398	32778	A61F2220/0025.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L399	9317	A61F2220/0058.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L400	18227	A61F2220/0075.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L401	3573	A61F2230/001.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L402	3174	A61F2230/0034.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L403	14799	A61F2230/0067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L404	1655	A61F2250/0048.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L405	4153	A61F2250/0069.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L406	2578	(L378 L379 L380 L381 L382 L383 L384 L385 L386 L387 L388 L389 L390 L391 L392 L393 L394 L395 L396 L397 L398 L399 L400 L401 L402 L403 L404 L405) and (heart adj3 valve) and (fiber$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/21 09:13 PM
L407	15	((frame same (inner and outer) same seal$4) same graft) and (heart with valve)	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/03/25 04:13 PM
L408	14	(US-10792172-$ | US-	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/03/25

		17096253-$ | US-20040082989-$ | US-20040256759-$ | US-20120123529-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	USOCR; FPRS; EPO; JPO; DERWENT)				04:13 PM
L409	9	(US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | US-20120123529-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L410	23	(US-10792172-$ | US-17096253-$ | US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L411	21	(US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | WO-2006124649-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L412	5773	A61F2/856.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L413	26431	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L414	17826	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L415	17867	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L416	4044	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L417	6084	A61F2/24.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L418	7541	A61F2/86.CPC.	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/03/25

			USOCR; FPRS; EPO; JPO; DERWENT)				04:13 PM
L419	11784	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L420	18994	A61F2/90.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L421	5686	A61F2002/061.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L422	4852	A61F2002/067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L423	554	A61F2210/00.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L424	12667	A61F2210/0014.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L425	1775	A61F2210/0057.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L426	12059	A61F2220/0008.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L427	15690	A61F2220/0016.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L428	32783	A61F2220/0025.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L429	9318	A61F2220/0058.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L430	18235	A61F2220/0075.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L431	3576	A61F2230/001.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L432	3174	A61F2230/0034.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L433	14804	A61F2230/0067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L434	1655	A61F2250/0048.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L435	4158	A61F2250/0069.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2021/03/25 04:13 PM

			JPO; DERWENT)				
L436	2585	(L408 L409 L410 L411 L412 L413 L414 L415 L416 L417 L418 L419 L420 L421 L422 L423 L424 L425 L426 L427 L428 L429 L430 L431 L432 L433 L434 L435) and (heart adj3 valve) and (fiber$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/25 04:13 PM
L438	0	("13706896").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/03/27 09:37 AM
L439	34	"13706896"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 09:37 AM
L440	1	("7799072").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/03/27 09:58 AM
L441	70	(US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17170957-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100204781-$ | US-20110009948-$ | US-20110098802-$ | US-20110218619-$ | US-20110319991-$ | US-20120123529-$ | US-20120296418-$ | US-20130304196-$ | US-3333075-$ | US-3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:38 AM
L442	14	(US-10792172-$ | US-17096253-$ | US-20040082989-$ | US-20040256759-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM

		20120123529-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.					
L443	9	(US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | US-20120123529-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L444	23	(US-10792172-$ | US-17096253-$ | US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | US-3333075-$ | US-3370418-$ | US-3829057-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L445	21	(US-20020052649-$ | US-20030153974-$ | US-20040082989-$ | US-20040256759-$ | WO-2006005015-$ | WO-2006124649-$ | US-20110098802-$ | US-20120123529-$ | US-20130304196-$ | WO-3829057-$ | WO-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L446	5776	A61F2/856.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L447	26437	A61F2/07.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L448	17841	A61F2/2418.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L449	17872	A61F2/82.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L450	4046	A61F2/962.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L451	6089	A61F2/24.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L452	7542	A61F2/86.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM

L453	11785	A61F2/89.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L454	18999	A61F2/90.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L455	5689	A61F2002/061.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L456	4854	A61F2002/067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L457	555	A61F2210/00.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L458	12674	A61F2210/0014.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L459	1777	A61F2210/0057.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L460	12063	A61F2220/0008.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L461	15695	A61F2220/0016.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L462	32786	A61F2220/0025.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L463	9323	A61F2220/0058.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L464	18239	A61F2220/0075.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L465	3579	A61F2230/001.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L466	3175	A61F2230/0034.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L467	14810	A61F2230/0067.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L468	1657	A61F2250/0048.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L469	4160	A61F2250/0069.CPC.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/03/27 10:39 AM
L470	2587	(L442 L443 L444 L445	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/03/27

		L446 L447 L448 L449 L450 L451 L452 L453 L454 L455 L456 L457 L458 L459 L460 L461 L462 L463 L464 L465 L466 L467 L468 L469) and (heart adj3 valve) and (fiber$3)	USOCR; FPRS; EPO; JPO; DERWENT)				10:39 AM
L471	0	("16910189").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/04/08 04:49 PM
L472	6	"16910189"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/08 04:49 PM
L473	11	"16808137"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/08 05:22 PM
L474	1	("10881538").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/04/08 06:29 PM
L475	2	"16941117"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/08 06:36 PM
L476	72	(US-10016271-$ | US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17006793-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100204781-$ | US-20110009948-$ | US-20110098802-$ | US-20110218619-$ | US-20110319991-$ | US-20120123529-$ | US-20120296418-$ | US-20130304196-$ | US-3333075-$ | US-3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/08 11:48 PM

		20130144373-$).DID.					
L477	0	(AI-20020052649-$ | AI-20030153974-$ | AI-20040243221-$ | AI-20040256759-$ | NO-2006005015-$ | AI-20060276813-$ | NO-2006124649-$ | AI-20070179591-$ | AI-20070213815-$ | AI-20070219620-$ | AI-20080021547-$ | AI-20080077236-$ | AI-20080188929-$ | AI-20080319521-$ | AI-20090105805-$ | AI-20100204781-$ | AI-20110009948-$ | AI-20110098802-$ | AI-20110218619-$ | AI-20110319991-$ | AI-20120123529-$ | AI-20120296418-$ | AI-20130304196-$ | NO-3829057-$ | IF-617622-$ | SO-0225223-$ | VA-223131450-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/08 11:48 PM
L478	54	"2006124649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/09 09:42 AM
L479	3	"20060259136"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/09 02:18 PM
L480	52	(US-20140046426-$ or US-20060074484-$ or US-20130144373-$ or US-20140316513-$ or US-20070168013-$ or US-20060155366-$ or US-20130131787-$ or US-20200000579-$ or US-20190029848-$ or US-20150148896-$ or US-20020082684-$ or US-20130090729-$ or US-20040256759-$ or US-20020052649-$ or US-20050027348-$ or US-20170000604-$ or US-20140155997-$ or US-20140222144-$ or US-20110098802-$ or US-20100185277-$ or US-20170014228-$ or US-20050043790-$ or US-20090276040-$ or US-20110218619-$ or	(US-PGPUB; USPAT; FPRS; DERWENT)	OR	OFF	OFF	2021/04/09 04:30 PM

		US-20050137695-$ or US-20140277417-$).did. or (US-20200179143-$ or US-20160354201-$ or US-20160310268-$ or US-20150190227-$ or US-20070239265-$ or US-20070233228-$ or US-20130317598-$ or US-20080319521-$).did. or (US-7252682-$ or US-7771467-$ or US-8016877-$ or US-10034784-$ or US-5824037-$ or US-6846325-$ or US-5713953-$ or US-7914569-$ or US-9867697-$ or US-9370418-$).did. or (WO-2006124649-$).did. or (US-20070067014-$ or US-20190029848-$ or US-20180325703-$ or US-20040256759-$ or US-20020052649-$ or WO-9719653-$).did.					
L481	28	L480 and (mitral)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/09 04:37 PM
L482	6	"20020052649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/10 11:44 AM
L483	2	"17170957"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/10 03:48 PM
L484	2	"17170957"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/24 09:59 AM
L485	5	"17060557"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/24 09:59 AM
L486	6	"20020052649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/24 10:57 AM
L487	55	"2006124649"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/27 10:15 AM
L488	52	(US-20140046426-$ or US-20060074484-$ or US-20130144373-$ or US-20140316513-$ or US-20070168013-$ or	(US-PGPUB; USPAT; FPRS; DERWENT)	OR	OFF	OFF	2021/04/27 10:19 AM

		US-20060155366-$ or US-20130131787-$ or US-20200000579-$ or US-20190029848-$ or US-20150148896-$ or US-20020082684-$ or US-20130090729-$ or US-20040256759-$ or US-20020052649-$ or US-20050027348-$ or US-20170000604-$ or US-20140155997-$ or US-20140222144-$ or US-20110098802-$ or US-20100185277-$ or US-20170014228-$ or US-20050043790-$ or US-20090276040-$ or US-20110218619-$ or US-20050137695-$ or US-20140277417-$).did. or (US-20200179143-$ or US-20160354201-$ or US-20160310268-$ or US-20150190227-$ or US-20070239265-$ or US-20070233228-$ or US-20130317598-$ or US-20080319521-$).did. or (US-7252682-$ or US-7771467-$ or US-8016877-$ or US-10034784-$ or US-5824037-$ or US-6846325-$ or US-5713953-$ or US-7914569-$ or US-9867697-$ or US-9370418-$).did. or (WO-2006124649-$).did. or (US-20070067014-$ or US-20190029848-$ or US-20180325703-$ or US-20040256759-$ or US-20020052649-$ or WO-9719653-$).did.					
L489	39	L488 and (seal with3 (inflow and outflow))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/27 10:19 AM
L490	41	L488 and (seal$4 with3 (inflow and outflow))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/27 10:23 AM
L491	21	("2014/0316513").URPN.	(USPAT)	OR	OFF	OFF	2021/04/27 10:28 AM
L492	0	"17006793"	(USPAT)	OR	OFF	OFF	2021/04/27

							10:32 AM
L493	1	"16792197"	(USPAT)	OR	OFF	OFF	2021/04/27 10:32 AM
L494	4	"20110098802"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/27 11:19 AM
L496	52	(US-20140046426-$ or US-20060074484-$ or US-20130144373-$ or US-20140316513-$ or US-20070168013-$ or US-20060155366-$ or US-20130131787-$ or US-20200000579-$ or US-20190029848-$ or US-20150148896-$ or US-20020082684-$ or US-20130090729-$ or US-20040256759-$ or US-20020052649-$ or US-20050027348-$ or US-20170000604-$ or US-20140155997-$ or US-20140222144-$ or US-20110098802-$ or US-20100185277-$ or US-20170014228-$ or US-20050043790-$ or US-20090276040-$ or US-20110218619-$ or US-20050137695-$ or US-20140277417-$).did. or (US-20200179143-$ or US-20160354201-$ or US-20160310268-$ or US-20150190227-$ or US-20070239265-$ or US-20070233228-$ or US-20130317598-$ or US-20080319521-$).did. or (US-7252682-$ or US-7771467-$ or US-8016877-$ or US-10034784-$ or US-5824037-$ or US-6846325-$ or US-5713953-$ or US-7914569-$ or US-9867697-$ or US-9370418-$).did. or (WO-2006124649-$).did. or (US-20070067014-$ or US-20190029848-$ or US-20180325703-$ or US-20040256759-$ or US-	(US-PGPUB; USPAT; FPRS; DERWENT)	OR	OFF	OFF	2021/04/27 07:42 PM

		20020052649-$ or WO-9719653-$).did.					
L497	41	L496 and (seal$4 with3 (inflow and outflow))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/04/27 07:42 PM
L498	4	"20110098802"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/05/24 12:23 PM
L499	15	((("AORTIC") near3 ("INNOVATIONS") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	OFF	OFF	2021/05/25 08:57 AM
L500	54	((("SHAHRIARI") near3 ("Ali"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/05/25 08:57 AM
L503	22	(US-17170957-$ | US-20050240137-$ | US-20060013863-$ | US-20140277424-$ | US-20150148889-$ | US-20150335424-$ | US-20150335429-$ | US-20160022444-$ | US-20190192286-$ | US-20200352707-$ | US-3039757-$ | US-3421098-$ | US-3834552-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/05/30 05:02 PM
L504	74	(US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17213251-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100204781-$ | US-20110009948-$ | US-20110098802-$ | US-20110218619-$ | US-20110319991-$ | US-20120123529-$ | US-20120296418-$ | US-20130304196-$ | US-20150335429-$ | US-20160022444-$ | US-3333075-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/02 01:20 PM

		3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.					
L505	3	"17007373"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/02 04:13 PM
L506	52	(US-20140046426-$ or US-20060074484-$ or US-20130144373-$ or US-20140316513-$ or US-20070168013-$ or US-20060155366-$ or US-20130131787-$ or US-20200000579-$ or US-20190029848-$ or US-20150148896-$ or US-20020082684-$ or US-20130090729-$ or US-20040256759-$ or US-20020052649-$ or US-20050027348-$ or US-20170000604-$ or US-20140155997-$ or US-20140222144-$ or US-20110098802-$ or US-20100185277-$ or US-20170014228-$ or US-20050043790-$ or US-20090276040-$ or US-20110218619-$ or US-20050137695-$ or US-20140277417-$).did. or (US-20200179143-$ or US-20160354201-$ or US-20160310268-$ or US-20150190227-$ or US-20070239265-$ or US-20070233228-$ or US-20130317598-$ or US-20080319521-$).did. or (US-7252682-$ or US-7771467-$ or US-8016877-$ or US-10034784-$ or US-5824037-$ or US-6846325-$ or US-5713953-$ or US-7914569-$ or US-9867697-$ or US-9370418-$).did. or	(US-PGPUB; USPAT; FPRS; DERWENT)	OR	OFF	OFF	2021/06/03 01:29 PM

		(WO-2006124649-$).did. or (US-20070067014-$ or US-20190029848-$ or US-20180325703-$ or US-20040256759-$ or US-20020052649-$ or WO-9719653-$).did.					
L507	15	L506 and (collagen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 01:29 PM
L508	22	(US-17170957-$ | US-20050240137-$ | US-20060013863-$ | US-20140277424-$ | US-20150148889-$ | US-20150335424-$ | US-20150335429-$ | US-20160022444-$ | US-20190192286-$ | US-20200352707-$ | US-3039757-$ | US-3421098-$ | US-3834552-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 01:55 PM
L509	74	(US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17213251-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100204781-$ | US-20110009948-$ | US-20110098802-$ | US-20110218619-$ | US-20110319991-$ | US-20120123529-$ | US-20120296418-$ | US-20130304196-$ | US-20150335429-$ | US-20160022444-$ | US-3333075-$ | US-3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 01:55 PM

		5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.					
L510	92	L508 L509	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 01:55 PM
L511	10	L510 and (collagen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 01:55 PM
L512	232	(collagen same fibers same graft) and (heart and valve)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/03 02:01 PM
L513	1	("7921678").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/06/03 02:08 PM
L514	35	(US-17170957-$ | US-20030153974-$ | US-20060025857-$ | US-20060074484-$ | US-20070282436-$ | US-20100036484-$ | US-20110040367-$ | US-20110098802-$ | US-20110125244-$ | US-20110166636-$ | US-20120022633-$ | US-20120071969-$ | US-20120310328-$ | US-20130018458-$ | US-20130073030-$ | US-20140018915-$ | US-20140155997-$ | US-20170128209-$).DID.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/06/18 10:36 AM
L518	6	(("20130018458") or ("20110125244") or ("20110166636") or ("20110098802") or ("20060074484") or ("20120310328")).PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/01 09:32 AM
L519	1	("20020087210").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/01 09:43 AM
L520	102	(US-10258464-$ | US-10792172-$ | US-1164046-$ | US-17327673-$ | US-20020052649-$ | US-20030153974-$ | US-20040243221-$ | US-20040256759-$ | US-20060025857-$ | US-20060074484-$ | US-20060276813-$ | US-20070179591-$ | US-20070213815-$ | US-20070219620-$ | US-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/21 04:59 PM

		20070282436-$ | US-20080021547-$ | US-20080077236-$ | US-20080188929-$ | US-20080319521-$ | US-20090105805-$ | US-20100036484-$ | US-20100204781-$ | US-20110009948-$ | US-20110040367-$ | US-20110098802-$ | US-20110125244-$ | US-20110166636-$ | US-20110218619-$ | US-20110319991-$ | US-20120022633-$ | US-20120071969-$ | US-20120123529-$ | US-20120296418-$ | US-20120310328-$ | US-20130018458-$ | US-20130073030-$ | US-20130304196-$ | US-20140018915-$ | US-20140155997-$ | US-20150335429-$ | US-20160022444-$ | US-20170128209-$ | US-3333075-$ | US-3339377-$ | US-3370418-$ | US-3408214-$ | US-3532868-$ | US-3829057-$ | US-5663667-$ | US-5665117-$ | US-5824037-$ | US-20130144373-$).DID.					
L521	0	(AI-20020052649-$ | AI-20030153974-$ | AI-20040243221-$ | AI-20040256759-$ | AI-20060025857-$ | NO-2006005015-$ | AI-20060074484-$ | AI-20060276813-$ | NO-2006124649-$ | AI-20070179591-$ | AI-20070213815-$ | AI-20070219620-$ | AI-20070282436-$ | AI-20080021547-$ | AI-20080077236-$ | AI-20080188929-$ | AI-20080319521-$ | AI-20090105805-$ | AI-20100036484-$ | AI-20100204781-$ | AI-	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/21 05:17 PM

		20110009948-$ | AI-20110040367-$ | AI-20110098802-$ | AI-20110125244-$ | AI-20110166636-$ | AI-20110218619-$ | AI-20110319991-$ | AI-20120022633-$ | AI-20120071969-$ | AI-20120123529-$ | AI-20120296418-$ | AI-20120310328-$ | NO-2012068175-$ | AI-20130018458-$ | AI-20130073030-$ | AI-20130304196-$ | AI-20140018915-$ | AI-20140155997-$ | AI-20150335429-$ | AI-20160022444-$ | AI-20170128209-$ | NO-3829057-$ | SO-0225223-$ | VA-223131450-$).DID.					
L522	0	"17327673"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/22 11:09 AM
L523	4	"17096253"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/22 11:10 AM
L524	0	("16107823").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/22 02:32 PM
L525	1	"16107823"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/22 02:32 PM
L526	17	((("AORTIC") near3 ("INNOVATIONS") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	OFF	OFF	2021/07/22 03:41 PM
L527	58	((("SHAHRIARI") near3 ("Ali"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/22 03:41 PM
L528	52	(US-20140046426-$ or US-20060074484-$ or US-20130144373-$ or US-20140316513-$ or US-20070168013-$ or US-20060155366-$ or US-20130131787-$ or US-20200000579-$ or US-20190029848-$ or US-20150148896-$ or US-20020082684-$ or US-20130090729-$ or US-20040256759-$ or US-20020052649-$ or	(US-PGPUB; USPAT; FPRS; DERWENT)	OR	OFF	OFF	2021/07/25 04:50 PM

		US-20050027348-$ or US-20170000604-$ or US-20140155997-$ or US-20140222144-$ or US-20110098802-$ or US-20100185277-$ or US-20170014228-$ or US-20050043790-$ or US-20090276040-$ or US-20110218619-$ or US-20050137695-$ or US-20140277417-$).did. or (US-20200179143-$ or US-20160354201-$ or US-20160310268-$ or US-20150190227-$ or US-20070239265-$ or US-20070233228-$ or US-20130317598-$ or US-20080319521-$).did. or (US-7252682-$ or US-7771467-$ or US-8016877-$ or US-10034784-$ or US-5824037-$ or US-6846325-$ or US-5713953-$ or US-7914569-$ or US-9867697-$ or US-9370418-$).did. or (WO-2006124649-$).did. or (US-20070067014-$ or US-20190029848-$ or US-20180325703-$ or US-20040256759-$ or US-20020052649-$ or WO-9719653-$).did.					
L529	15	L528 and collagen	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/25 04:50 PM
L530	4	"20110098802"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/25 05:00 PM
L531	23	"2005023584"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/25 05:16 PM
L532	12	"20050023584"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/25 05:17 PM
L533	0	("2005023584").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/25 05:18 PM
L534	1	("20050023584").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/25 05:18 PM
L535	1	("20060004442").PN.	(US-PGPUB; USPAT;	OR	OFF	OFF	2021/07/25

			USOCR)				05:19 PM
L536	398	("2006/0004442").URPN.	(USPAT)	OR	OFF	OFF	2021/07/25 05:20 PM
L537	1	("20130018458").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/07/25 05:28 PM
L539	41	"13706896"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/30 11:20 AM
L542	22	"10299917"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/08/23 10:08 AM
L545	234	(collagen same fibers same graft) and (heart and valve)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/08/25 02:20 PM
L546	3	"20060276813"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/08/26 12:46 PM
L547	25	"2011143263"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/08/26 12:47 PM
L548	8	("20030153974"|"3365728"|"5411552"|"6893460"|"7393360"|"7510575"|"9393110"|"9829057").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/11/16 10:19 AM
L549	1	(("20060276813") or ("2011143263")).PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/16 10:26 AM
L550	2	(("20060276813") or ("20110143263")).PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/16 10:26 AM
L551	25	"2011143263"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/11/16 10:27 AM
L552	2	"16941117"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/11/16 01:48 PM
L553	9	("20030153974"|"20060276813"|"3365728"|"5411552"|"6893460"|"7393360"|"7510575"|"9393110"|"9829057").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/11/17 04:07 PM
L554	6	"20120123529"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/11/19 07:46 PM
L555	3	"20050273155"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/11/19 08:08 PM
L556	1	("7511575").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 02:26 PM
L557	1	("7510575").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 02:26 PM
L558	1	("11129735").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:09 PM

L559	1	("11045335").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:10 PM
L560	1	("11026817").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:11 PM
L561	1	("10966846").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:11 PM
L562	1	("10888441").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:20 PM
L563	3	(("10881538") or ("10857011") or ("10792172")).PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/20 04:20 PM
L564	13	("20020052649"|"20030153974"|"20090281619"|"20110098802"|"3365728"|"5411552"|"5957949"|"6730118"|"6893460"|"7393360"|"7510575"|"7585321"|"9393110").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/11/28 06:03 AM
L565	1	("20120123529").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/28 10:31 AM
L566	1	("7510575").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/11/28 10:47 AM
L567	1	("20120123529").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2021/12/02 03:03 PM
L568	13	("20020052649"|"20030153974"|"20090281619"|"20110098802"|"3365728"|"5411552"|"5957949"|"6730118"|"6893460"|"7393360"|"7510575"|"7585321"|"9393110").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/12/02 07:07 PM
L570	0	("11441406").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2022/01/23 02:18 PM
L571	15	"11441406"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/01/23 02:18 PM
L572	3	"20120143324"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/01/26 03:46 PM
L573	1	("20130304200").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2022/05/30 10:36 AM
L577	1	WO2005112821	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/06/03 02:51 PM
L578	17	"2005112821"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/06/03 02:51 PM
L579	3	"20050273155"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/06/03 02:54 PM

L582	119	"2006005015"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/06/09 07:54 PM
L583	27	("10034784"|"20010044650"|"20020082684"|"20040249399"|"20070219613"|"20090036977"|"20090099650"|"20100087907"|"20130013050"|"5609627"|"6464721"|"6482228"|"6773457"|"6814752"|"7074235"|"7306623"|"7998187"|"8002816"|"8025694"|"8506622"|"8545549"|"8562673"|"8652198"|"8715337"|"9220613"|"9289282"|"9757263").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/06/10 12:40 PM
L584	1	("7799072").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2022/06/10 01:35 PM
L585	62	("20010000188" | "20020032481" | "20020156523" | "20020193871" | "20030023300" | "20030023303" | "20030040792" | "20030130611" | "20030130730" | "20040054396" | "20040093070" | "20040106976" | "20040167606" | "20040236411" | "20040260389" | "20050043785" | "20050043790" | "20050055082" | "20050060026" | "20050075725" | "20050085893" | "20050096736" | "20050222674" | "20070142906" | "20070156233" | "20070239269" | "20070250154" | "5178634" | "5314468" | "5843158" | "5957949" | "6001126" | "6517570" | "6682476" | "7377938" | "7442204").PN. OR ("7799072").URPN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2022/06/10 01:36 PM
L586	0	("13706896").PN.	(US-PGPUB; USPAT; USOCR)	OR	OFF	OFF	2022/06/10 02:41 PM
L587	45	"13706896"	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/06/10

			USOCR; FPRS; EPO; JPO; DERWENT)				02:42 PM
L588	3	"20060276813"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/06/10 07:46 PM
L589	19	((("AORTIC") near3 ("INNOVATIONS") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/07/13 08:05 AM
L590	65	((("SHAHRIARI") near3 ("Ali"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/07/13 08:35 AM
L591	3	L21 and fiber	(USPAT)	OR	OFF	OFF	2022/07/13 09:38 AM
L592	51	L236 and ((fibers with collagen) same migration)	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/07/13 09:38 AM
L593	25	((frame same (inner and outer) same seal$4) same graft) and (heart with valve)	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/07/13 09:39 AM
L594	9	"10881538"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/07/13 07:08 PM
L595	2	("10881538").pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/07/13 07:08 PM
L596	9	"10881538"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	OFF	OFF	2022/07/13 07:08 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N36	1	(endograft and device and prosthetic and frame and conduit).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2014/12/01 09:57 AM
N37	1	(endograft and device and prosthetic and frame and conduit and balloon and taper).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2014/12/01 09:59 AM
N38	1	(endograft and device and prosthetic and frame and conduit and balloon and taper and valve).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2014/12/01 09:59 AM
N43	3	(endograft and stent and frame and valve and expandable).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2016/03/07 01:15 AM
N44	2	(endograft and stent and frame and valve and expandable and	(US-PGPUB; USPAT)	OR	ON	ON	2016/03/07 01:15 AM

		spaced and apart).clm.					
N45	2	(endograft and stent and frame and valve and expandable and first and second and aorta).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2016/03/07 01:16 AM
N119	3	(endograft and stent and frame and valve and expandable and first and second and aorta).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2019/12/08 04:14 PM
N177	80	(heart and valve and seal and fiber$2).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/06/07 09:57 AM
N178	5	(heart and valve and seal and fiber$2 and frame).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/06/07 09:57 AM
N179	2	(heart and valve and seal and fiber$2 and inner and outer and frame).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/06/07 10:00 AM
N213	1	(stent and cuff and sealing and aorta and ascending).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/07/20 12:00 PM
N214	1	(stent and cuff and sealing and aorta and ascending and artery).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/07/20 12:00 PM
N241	0	(heart and valve and outer and frame and inner and graft and covering and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:53 PM
N242	0	(heart and valve and outer and frame and inner and graft and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:54 PM
N243	0	(heart and valve and outer and frame and inner and graft and fibers and cover).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:54 PM
N244	0	(heart and valve and outer and frame and inner and graft and fibers and cover and grid$4).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/08/28 03:54 PM
N250	0	(heart and valve and outer and frame and inner and graft and fibers and cover and grid$4).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/09/27 11:19 PM
N251	1	(heart and valve and outer and frame and inner and graft and cover and grid$4).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/10/06 05:07 PM

N252	1	(heart and valve and outer and frame and graft and cover and grid$4).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/10/06 05:08 PM
N253	1	(heart and valve and frame and graft and cover and grid$4).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/10/06 05:08 PM
N254	35	(stent and frame and valve and expandable and first and second and aorta).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/10/07 09:03 AM
N255	12	(stent and graft and valve and housing and proximal).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/10/07 09:48 AM
N270	7138	(valve and outer and frame open and cell and graft and seals).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/11/19 03:35 PM
N271	1	(valve and outer and frame and open and cell and graft and seals).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2020/11/19 03:36 PM
N308	3	(valve and outer and frame and open and cell and graft and seal and fibers and balloon and expandable).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/01/27 10:11 AM
N437	2	(valve and outer and inner and frame and gridded and graft and seal and fibers and balloon and expandable).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/03/25 04:06 PM
N495	5	(valve and outer and inner and frame and open and cell and graft and seal and fibers and engage and covering).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/04/27 03:24 PM
N501	0	(valve and outer and frame and open and cell and apices and inner and frame and graft and seal and fiber and uncovered).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/05/25 09:24 AM
N502	0	(valve and outer and frame and open and cell and apices and inner and frame and graft and seal and fiber).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/05/25 09:31 AM
N515	0	(valve and outer and frame and open and cell and apices and inner and frame and graft and seal and fiber).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/06/18 10:09 AM

N516	2	(valve and outer and frame and open and cell and inner and frame and graft and seal and fiber).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/06/18 10:09 AM
N517	17	(US-17170957-$ | US-20030153974-$ | US-20060025857-$ | US-20060074484-$ | US-20070282436-$ | US-20100036484-$ | US-20110040367-$ | US-20110098802-$ | US-20110125244-$ | US-20110166636-$ | US-20120022633-$ | US-20120071969-$ | US-20120310328-$ | US-20130018458-$ | US-20130073030-$ | US-20140018915-$ | US-20140155997-$ | US-20170128209-$).DID.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/06/18 10:17 AM
N538	0	(valve and frame and open and cell and inner and skirt and graft and seal and fiber).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/07/25 05:21 PM
N540	3	(valve and outer and frame and open and cell and inner and frame and graft and seal and fiber).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/07/30 01:52 PM
N541	10	(valve and outer and frame and open and cell and inner and frame and graft and sealing and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/07/30 01:53 PM
N543	10	(valve and outer and frame and open and cell and inner and frame and graft and sealing and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/08/24 05:04 PM
N544	10	(valve and outer and frame and open and cell and inner and frame and graft and sealing and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/08/24 05:06 PM
N569	11	(valve and outer and frame and open and cell and inner and frame and graft and sealing and fibers).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/12/02 07:22 PM
N574	223	2013/0304200	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/05/30 10:36 AM
N575	1	(valve and graft and	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/06/03

		covering and frame and fibers and spaced and apart).clm.					12:50 PM
N576	2	"20040044406"	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/06/03 01:16 PM
N580	1	"2005112821"	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/06/03 02:50 PM
N581	0	WO2005112821	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/06/03 02:51 PM

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 07/08/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER
CENTRAL, DOCKET

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
07/08/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

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In re Application of	:	
Ali Shahriari	:	
Application No. 17/719,160	:	
Filed: 12 Apr 2022	:	DECISION ON PETITION
For: TRANSCATHETER VALVE REPAIR	:	
HAVING IMPROVED PARAVALVULAR	:	
SEAL	:	

This is a decision on the renewed request to participate in the Patent Prosecution Highway (PPH) program and the petition under 37 CFR 1.102(a), filed 24 June 2022 in response to the decision mailed on 17 June 2022 dismissing the original request to make the above-identified application special.

The request and petition are **GRANTED.** *It is noted that the PPH request lists the relied upon OEE work product as the "Decision to Grant a Patent". However, a Decision to Grant a Patent cannot be the relied upon work product unless it is a first action allowance. Therefore, the decision herein is based on the "Requisition by the Examiner" mailed on 24 August 2020.*

DISCUSSION

A grantable request to participate in the PPH pilot program and petition to make special require:

1. The U.S. application for which participation in the Global/IP5 PPH pilot program is requested must have the same earliest date, whether this is the priority date or filing date, as that of a corresponding national or regional application filed with another Global/IP5 PPH participating office or a corresponding PCT international application for which one of the Global/IP5 PPH participating offices was the International Searching Authority (ISA) or the International Preliminary Examining Authority (IPEA);

2. Applicant must:
    a. Ensure all the claims in the U.S. application must sufficiently correspond or be amended to sufficiently correspond to the allowable/patentable claim(s) in the corresponding Office of Earlier Examination (OEE) application and

b. Submit a claims correspondence table in English;

3. Examination of the U.S. application has not begun;

4. Applicant must submit:
   a. Documentation of prior office action:
      i. a copy of the office action(s) just prior to the "Decision to Grant a Patent" from each of the Global/IP5 PPH participating office application(s) containing the allowable/patentable claim(s) or
      ii. if the allowable/patentable claims(s) are from a "Notification of Reasons for Refusal" then the Notification of Reasons for Refusal or
      iii. if the Global/IP5 PPH participating office application is a first action allowance then no office action from the Global/IP5 PPH participating office is necessary should be indicated on the request/petition form or
      iv. the latest work product in the international phase of the OEE PCT application;
   b. An English language translation of the Global/IP5 PPH participating office action or work product from (4)(a)(i)-(ii) or (iv) above; and

5. Applicant must submit:
   a. An IDS listing the documents cited by the Global/IP5 PPH participating office examiner in the Global/IP5 PPH participating office action or work product (unless already submitted in this application) and
   b. Copies of the documents except U.S. patents or U.S. patent application publications (unless already submitted in this application).

The request to participate in the PPH pilot program and petition now comply with the above requirements in light of the renewed PPH request and OEE work product submitted on 24 June 2022. Accordingly, the above-identified application has been accorded "special" status.

Telephone inquiries related to this decision should be directed to Paralegal Specialist Paula Britton at 571-272-1556. All other inquiries concerning the examination or status of the application is accessible in the PAIR system at http://portal.uspto.gov/.

/JOANNE L BURKE/
Lead Paralegal Specialist, OPET

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	17719160
Filing Date	2022-04-12
First Named Inventor	Ali Shahriari
Art Unit	3774
Examiner Name	
Attorney Docket Number	426/2/25 UTIL

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	
	Attorney Docket Number	426/2/25 UTIL

	1	NOTICE OF REQUISITION, CANADIAN PATENT OFFICE for CA Application No. 3,082,787 dated 8/24/2020
	2	Commissioner's Notice- Application Found Allowable, CANADIAN PATENT OFFICE for CA Application No. 3,082,787 dated 2/5/2021

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17719160
	Filing Date	2022-04-12
	First Named Inventor	Ali Shahriari
	Art Unit	3774
	Examiner Name	
	Attorney Docket Number	426/2/25 UTIL

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Justin R. Nifong/	Date (YYYY-MM-DD)	2022-06-24
Name/Print	Justin R. Nifong	Registration Number	59389

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

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

PTO/SB/20GLBL (06-20)
Approved for use through 06/30/2021. OMB 0651-0058
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE

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REQUEST FOR PARTICIPATION IN THE GLOBAL/IP5 PATENT PROSECUTION HIGHWAY (PPH) PILOT PROGRAM IN THE USPTO

Application No.:	17719160	First Named Inventor:	Ali Shahriari
Filing Date:	4/12/2002	Attorney Docket No.:	426/2/25 UTIL
Title of the Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL		

THIS REQUEST FOR PARTICIPATION IN THE PPH PILOT PROGRAM ALONG WITH THE REQUIRED DOCUMENTS MUST BE SUBMITTED VIA EFS-WEB. INFORMATION REGARDING EFS-WEB IS AVAILABLE AT
https://www.uspto.gov/patents-application-process/applying-online/about-efs-web

APPLICANT HEREBY REQUESTS PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PILOT PROGRAM AND PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE PPH PILOT PROGRAM.

Office of earlier examination (OEE): Canada (Canadian Intellectual Property Office)

OEE application number: 3,082,787

Both the OEE application and the above-identified U.S. application have the following earliest date (filing or priority date): 12/6/2011

Type of OEE work product relied upon: Decision to grant a patent

Mailing date of OEE work product: 10/5/2020

Supporting Documents

1. OEE Work Product and Translation

A copy of the OEE work product and translation if not already in English:

☒ Attached ☐ Previously Submitted ☐ Not required because the decision to grant a patent was the first office action

☐ Applicant requests the USPTO to attempt to obtain the OEE work productd from the Dossier Access System or PATENTSCOPE

NOTE: If the applicant requests the USPTO to obtain the OEE work product electronically and such attempt is unsuccessful, the applicant will be required to supply the document. Accordingly, to avoid dismissal of the initial PPH request and potential denial of participation in the PPH program, the applicant should verify that the OEE work product is actually available via the Dossier Access System or PATENTSCOPE before requesting retrieval. If the applicant is unable to verify availability, then the applicant should submit the document with the PPH request.

2. References Cited in OEE Work Product

An information disclosure statement (IDS) listing the references cited in the OEE work product and document copies (except U.S. patents and U.S. published patent applications):

☒ Attached ☐ Previously Submitted ☐ Not required because no references were cited in the OEE work product

This collection of information is required by 35 U.S.C. 119, 37 CFR 1.55, and 37 CFR 1.102(d). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS

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REQUEST FOR PARTICIPATION IN THE GLOBAL/IP5 PPH PILOT PROGRAM IN THE USPTO

(continued)

Application No.:	17719160	First Named Inventor:	Ali Shahriari

3. Claims Correspondence Certification Statement

All of the claims in this application sufficiently correspond to the patentable/allowable claims in the OEE application.

4. Claims Correspondence Table

Claims in U.S. Application	Patentable Claims in OEE Application	Explanation Regarding the Correspondence
2	1	Same claim language

Signature	/Justin R. Nifong/	Date	6/24/2022
Name (print or type)	Justin R. Nifong	Registration Number	59389

Privacy Act Statement

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	46035062
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	24-JUN-2022
Filing Date:	12-APR-2022
Time Stamp:	06:55:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	3082787.pdf	231939 973671cbea608db0d4dfda9a24dfdfc1e1ab429a	no	4

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	426-2-25-pph-ids.pdf	612262 5cd5d89bd002b5991b7483437d7bdfadc070d744	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Non Patent Literature	document-CA-allowance.pdf	476558 f1a9c083a59ea585f970ccdaeffc21152b830839	no	4
Warnings:					
Information:					
4	Petition to make Special under Patent Prosecution Highway	426-2-25-PPH-Request-Form.pdf	756012 1159d471efa768856fbc88f8c84957ff21c656f0	no	3
Warnings:					
Information:					
			Total Files Size (in bytes):	2076771	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/719,160	04/12/2022	Ali Shahriari	426/2/25 UTIL	1031

175373 7590 06/17/2022

Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

EXAMINER
CENTRAL, DOCKET

ART UNIT	PAPER NUMBER
3774	

NOTIFICATION DATE	DELIVERY MODE
06/17/2022	ELECTRONIC

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

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

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

usptomail@nkpatentlaw.com

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In re Application of	:	
Ali Shahriari	:	
Application No. 17/719,160	:	
Filed: 12 Apr 2022	:	DECISION ON PETITION
For: TRANSCATHETER VALVE REPAIR	:	
HAVING IMPROVED PARAVALVULAR	:	
SEAL	:	

This is a decision on the petition pursuant to 37 CFR 1.182 filed 9 May 2022 to expedite the request to participate in the Patent Prosecution Highway (PPH) program and the petition under 37 CFR 1.102(a) filed 9 May 2022 to make the above-identified application special.

The petition pursuant to 37 CFR 1.182 is **GRANTED.**

The requisite $420.00 fee for the petition to expedite processing under 37 CFR 1.182 submitted on 9 May 2022 has been accepted. Accordingly, the petition under 37 CFR 1.102(a) is being considered out of turn.

The request and petition are **DISMISSED**.

DISCUSSION

A grantable request to participate in the PPH pilot program and petition to make special require:

1. The U.S. application for which participation in the Global/IP5 PPH pilot program is requested must have the same earliest date, whether this is the priority date or filing date, as that of a corresponding national or regional application filed with another Global/IP5 PPH participating office or a corresponding PCT international application for which one of the Global/IP5 PPH participating offices was the International Searching Authority (ISA) or the International Preliminary Examining Authority (IPEA);

2. Applicant must:
    a. Ensure all the claims in the U.S. application must sufficiently correspond or be amended to sufficiently correspond to the allowable/patentable claim(s) in the corresponding Office of Earlier Examination (OEE) application and

b. Submit a claims correspondence table in English;

3. Examination of the U.S. application has not begun;

4. Applicant must submit:
   a. Documentation of prior office action:
      i. a copy of the office action(s) just prior to the "Decision to Grant a Patent" from each of the Global/IP5 PPH participating office application(s) containing the allowable/patentable claim(s) or
      ii. if the allowable/patentable claims(s) are from a "Notification of Reasons for Refusal" then the Notification of Reasons for Refusal or
      iii. if the Global/IP5 PPH participating office application is a first action allowance then no office action from the Global/IP5 PPH participating office is necessary should be indicated on the request/petition form or
      iv. the latest work product in the international phase of the OEE PCT application;
   b. An English language translation of the Global/IP5 PPH participating office action or work product from (4)(a)(i)-(ii) or (iv) above; and

5. Applicant must submit:
   a. An IDS listing the documents cited by the Global/IP5 PPH participating office examiner in the Global/IP5 PPH participating office action or work product (unless already submitted in this application) and
   b. Copies of the documents except U.S. patents or U.S. patent application publications (unless already submitted in this application).

Conditions (1)-(3) above are considered to have been met. However, the request to participate in the PPH pilot program and petition fails to comply with conditions (4)-(5).

Regarding the requirement of condition (4), upon review of the PPH request, As the Applicant has stated the OEE work product is the decision to grant a patent, the appropriate box has not been checked, as stated in condition (4) a copy of the office action prior to the decision to grant must be submitted unless the decision to grant is a first office action.

Regarding the requirement of condition (5); petitioner must ensure that an IDS is filed listing all the documents cited by the Global/IP5 PPH participating office examined in the Global/IP5 participating office action or work product and the copies of the documents except U.S. patents/U.S. publications have been submitted.

Applicant is given **ONE** opportunity within a time period of **ONE MONTH or THIRTY DAYS**, whichever is longer, from the mailing date of this decision to correct the deficiencies. **NO EXTENSION OF TIME UNDER 37 CFR 1.136 IS PERMITTED.** If the deficiencies are not corrected with the time period given, the application will await action in its regular turn.

Response must be filed via the Electronic Filing System (EFS) using the document description: Petition to make special under Patent Pros Hwy. Any preliminary amendments and IDS

submitted with the PPH documents must be separately indexed as a preliminary amendment and IDS, respectively.

Telephone inquiries related to this decision should be directed to Paula Britton at 571-272-1556. All other inquiries concerning the examination or status of the application is accessible in the PAIR system at http://portal.uspto.gov.

/JOANNE L BURKE/
Lead Paralegal Specialist, OPET

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :C48879

Sale Accounting Date:06/01/2022

Sale Item Reference Number	Effective Date
17719160	05/09/2022

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I202261840042277	2462	PETITION FEE - 37 CFR 1.17(F) (GROUP I)	$210.00	Deposit Account

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	1031
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	-		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: DEVICE FOR AORTIC REPAIR AND METHOD OF USING THE SAME

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

PETITION TO EXPEDITE UNDER 37 CFR 1.182

Applicant hereby submits a petition under 37 CFR 1.182 to expedite consideration of the Request for Participation in the Global/IP5 Patent Prosecution Highway (PPH) Pilot Program filed concurrently with this Petition. A 37 CFR 1.182 petition to expedite fee of $210 is submitted concurrently with this filing.

Applicant requests expedited consideration of the Request for Participation in the Global/IP5 Patent Prosecution Highway (PPH) Pilot Program and further respectfully requests a prompt decision on the merits.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any otherwise unpaid fees associated with the filing of this correspondence to Deposit Account No. **50-6191**.

Respectfully submitted,

Date: May 9, 2022

/Justin R. Nifong/
Justin R. Nifong
Reg. No. 59,389

NK Patent Law
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606
Telephone: (919) 348-2194
Facsimile: (919) 882-8195

Customer No. 175373

PTO/SB/20GLBL (06-20)
Approved for use through 06/30/2021. OMB 0651-0058
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE

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

REQUEST FOR PARTICIPATION IN THE GLOBAL/IP5 PATENT PROSECUTION HIGHWAY (PPH) PILOT PROGRAM IN THE USPTO

Application No.:	17719160	First Named Inventor:	Ali Shahriari
Filing Date:	4/12/2022	Attorney Docket No.:	426/2/25 UTIL
Title of the Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL		

THIS REQUEST FOR PARTICIPATION IN THE PPH PILOT PROGRAM ALONG WITH THE REQUIRED DOCUMENTS MUST BE SUBMITTED VIA EFS-WEB. INFORMATION REGARDING EFS-WEB IS AVAILABLE AT
https://www.uspto.gov/patents-application-process/applying-online/about-efs-web

APPLICANT HEREBY REQUESTS PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PILOT PROGRAM AND PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE PPH PILOT PROGRAM.

Office of earlier examination (OEE): Canada (Canadian Intellectual Property Office)

OEE application number: 3,082,787

Both the OEE application and the above-identified U.S. application have the following earliest date (filing or priority date): 12/6/2011

Type of OEE work product relied upon: Decision to grant a patent

Mailing date of OEE work product: 10/5/2020

Supporting Documents

1. OEE Work Product and Translation

A copy of the OEE work product and translation if not already in English:

☒ Attached ☐ Previously Submitted ☐ Not required because the decision to grant a patent was the first office action

☐ Applicant requests the USPTO to attempt to obtain the OEE work productd from the Dossier Access System or PATENTSCOPE

NOTE: If the applicant requests the USPTO to obtain the OEE work product electronically and such attempt is unsuccessful, the applicant will be required to supply the document. Accordingly, to avoid dismissal of the initial PPH request and potential denial of participation in the PPH program, the applicant should verify that the OEE work product is actually available via the Dossier Access System or PATENTSCOPE before requesting retrieval. If the applicant is unable to verify availability, then the applicant should submit the document with the PPH request.

2. References Cited in OEE Work Product

An information disclosure statement (IDS) listing the references cited in the OEE work product and document copies (except U.S. patents and U.S. published patent applications):

☐ Attached ☐ Previously Submitted ☒ Not required because no references were cited in the OEE work product

This collection of information is required by 35 U.S.C. 119, 37 CFR 1.55, and 37 CFR 1.102(d). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS

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

REQUEST FOR PARTICIPATION IN THE GLOBAL/IP5 PPH PILOT PROGRAM IN THE USPTO

(continued)

Application No.:	17719160	First Named Inventor:	Ali Shahriari

3. Claims Correspondence Certification Statement

All of the claims in this application sufficiently correspond to the patentable/allowable claims in the OEE application.

4. Claims Correspondence Table

Claims in U.S. Application	Patentable Claims in OEE Application	Explanation Regarding the Correspondence
2	1	Same claim language

Signature	/Justin R. Nifong/	Date	5/9/2022
Name (print or type)	Justin R. Nifong	Registration Number	59389

Privacy Act Statement

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	45659525
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	09-MAY-2022
Filing Date:	12-APR-2022
Time Stamp:	08:12:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		426-2-25UTIL-Preliminary-Amendment-pph.pdf	134178 58e35a4acaf5d91a1cc6b0d0ebfec5e2a49e9de3	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3

Warnings:					
Information:					
2	Petition for review by the Office of Petitions	426-2-25-Petition-to-Expedite.pdf	126826 baa989615be8c6f91a8e824f381477262cb8b46e	no	2
Warnings:					
Information:					
3	Non Patent Literature	426-Canadian-Allowance.pdf	240574 0de073ea431c7c59855361f2e61ff13f6a313349	no	4
Warnings:					
Information:					
4	Petition to make Special under Patent Prosecution Highway	426-PPH-request-form.pdf	755949 102c6f5d434579b677cb3cce4e0d8e0fe77420bb	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	1257527		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

COMMUNICATION TO THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	17/719,160	Confirmation No.:	103
Applicant	:	Aortic Innovations, LLC		
First Named Inventor	:	Ali Shahriari		
Filing Date	:	April 12, 2022		
TC/A.U.	:	3774		
Examiner	:	-		
Docket No.	:	426/2/25 UTIL		
Customer No.	:	175373		

Title of Invention: TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

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

PRELIMINARY AMENDMENT

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 3 of this paper.

Amendments to the Claims:

The claims are amended as follows and will replace all previous versions and listings of claims:

Listing of Claims:

Claim 1 (Canceled)

2. (New) A heart valve assembly comprising:

a. an inner frame comprising a graft covering housing a prosthetic heart valve, wherein the graft covering extends around the prosthetic heart valve for providing sealing to the heart valve;

b. an outer frame formed from a metallic material and defining a gridded configuration, and being secured to the graft covering by a plurality of stitches; and

c. a sealing material positioned externally to the outer frame for providing sealing between the outer frame and a patient's anatomical wall to prevent paravalvular leaks,

wherein the sealing material includes a plurality of radially extending fibers that extend outwardly of the outer frame;

wherein the graft covering is made of polyester, polytetrafluoroethylene, expanded polytetrafluoroethylene, or a polymer.

REMARKS

Claim 1 has been canceled. New claim 2 has been added. Entry of the amendment and favorable consideration are requested. No new matter has been added.

This amendment is being filed with a request under the Patent Prosecution Highway program.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any otherwise unpaid fees associated with the filing of this correspondence to Deposit Account No. **50-6191**.

Respectfully submitted,

Date: May 9, 2022

/Justin R. Nifong/
Justin R. Nifong
Reg. No. 59,389

NK Patent Law
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606
Telephone: (919) 348-2194
Facsimile: (919) 882-8195

Customer No. 175373

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/719,160

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 240 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	830		TOTAL	

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/719,160	04/12/2022		830	426/2/25 UTIL	1	1

CONFIRMATION NO. 1031

FILING RECEIPT

175373
Aortic Innovations, LLC
4917 Waters Edge Drive, Suite 275
Raleigh, NC 27606

OC000000133247159

Date Mailed: 04/19/2022

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

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

Inventor(s)

Ali Shahriari, Hillsboro Beach, FL;

Applicant(s)

Aortic Innovations, LLC, Hillsboro Beach, FL;

Power of Attorney: The patent practitioners associated with Customer Number 175373

Domestic Priority data as claimed by applicant

This application is a CON of 17/327,673 05/22/2021
which is a CON of 17/213,251 03/26/2021
which is a CON of 17/096,253 11/12/2020 PAT 10966846
which is a CON of 17/060,557 10/01/2020 PAT 10888441
which is a CON of 16/910,189 06/24/2020 PAT 10857011
which is a CON of 16/808,137 03/03/2020 PAT 10792172
which is a CON of 16/736,879 01/08/2020 PAT 10842655
which is a CON of 16/042,286 07/23/2018 PAT 10555823
which is a CON of 14/614,628 02/05/2015 PAT 10028848
which is a CON of 14/569,306 12/12/2014 PAT 9339399
which is a DIV of 13/706,896 12/06/2012 PAT 8940040
which claims benefit of 61/723,446 11/07/2012
and claims benefit of 61/567,458 12/06/2011

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 04/18/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/719,160**

Projected Publication Date: 07/28/2022

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

Preliminary Class

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign

patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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POWER OF ATTORNEY FOR PATENT APPLICATIONS

Under 37 CFR § 3.73(b) and/or (c), Aortic Innovations, LLC, hereby certifies that it is the Assignee of the entire right, title, and interest in and to the patent applications listed below. Each of the patent applications listed below is assigned to Aortic Innovations, LLC. As required by 37 CFR § 3.73(b)(1)(i) and/or (c)(1)(i), the documentary evidence of the chain of title from the original owner to the Assignee was submitted for recordation pursuant to 37 § CFR 3.11 as shown in the Reel/Frame numbers listed below.

Title	Serial No.	Filing Date	Assignment	Date
Transcathetor Arotic Valve for Endovascular Aortic Repair	61/723,446	11/7/2012	029574/0731	1/7/2013
Transcathetor Aortic Valve for Endovascular Aortic Repair	61/567,458	12/6/2011	029005/0233	9/19/2012
Branched Aortic Graft and Method of Using the Same	61/777,918	3/12/2013	030346/0253	5/3/2013
Device for Endovascular Aortic Repair and Method of Using the Same	13/706,896	12/6/2012	032145/0666	2/5/2014
Device for Endovascular Aortic Repair and Method of Using the Same	US2012/068165	12/6/2012	029574/0887	1/7/2013
Transcatheral Mitral Valve and Delivery System	61/780,242	3/13/2013	030346/0233	5/3/2013
Device for Transcatheter Mitral Valve Repair and Replacement	61/817,118	4/29/2013	032145/0666	2/5/2014

The undersigned, acting as the Assignee, hereby revokes all prior powers of attorney, if applicable, and appoints the practitioners associated with the customer number 175373 as my/our attorney(s) or agent(s) to prosecute the patent(s) and/or patent application(s) and transact all business in the United States Patent and Trademark Office connected therewith.

By: Ali Shahriari Date: 1/15/2021

Ali Shahriari, Owner

Aortic Innovations, LLC

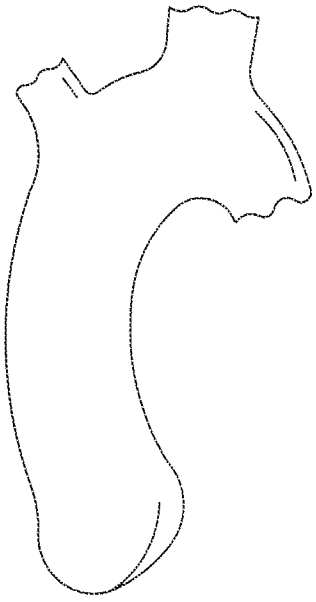


Fig. 1

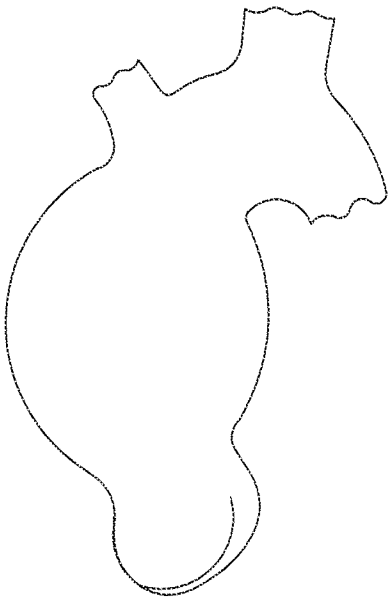


Fig. 1B

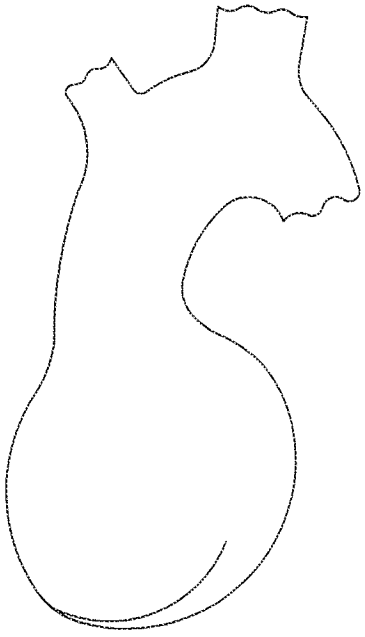


Fig. 1A

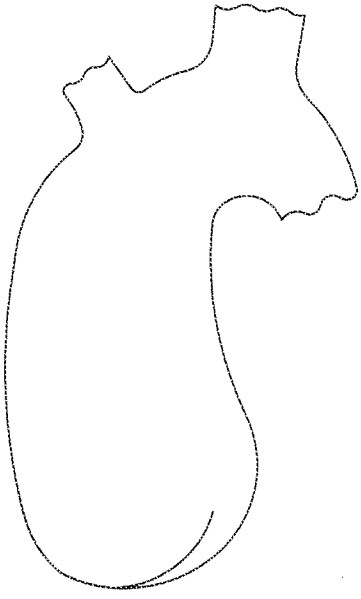


Fig. 1C

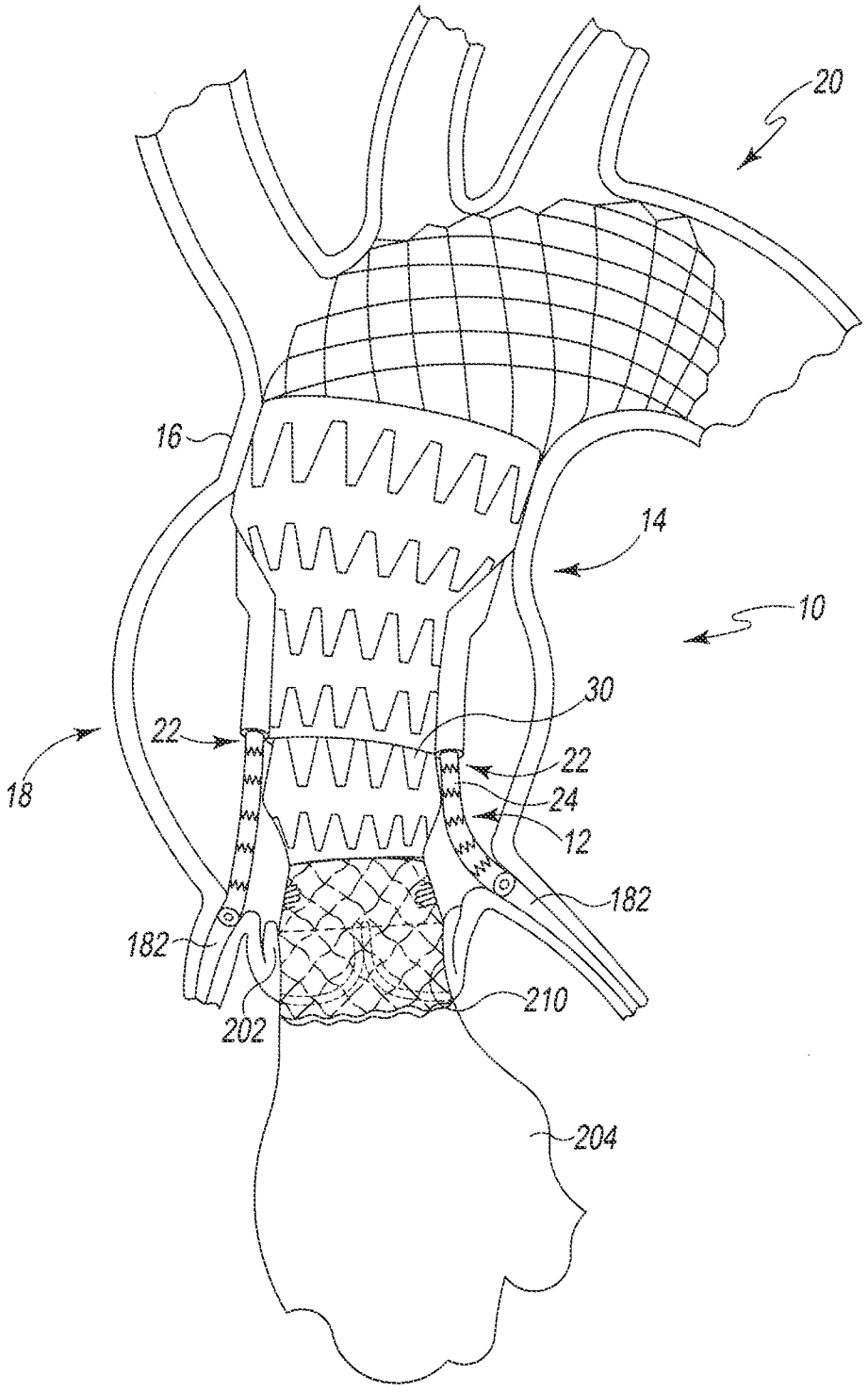


Fig. 2

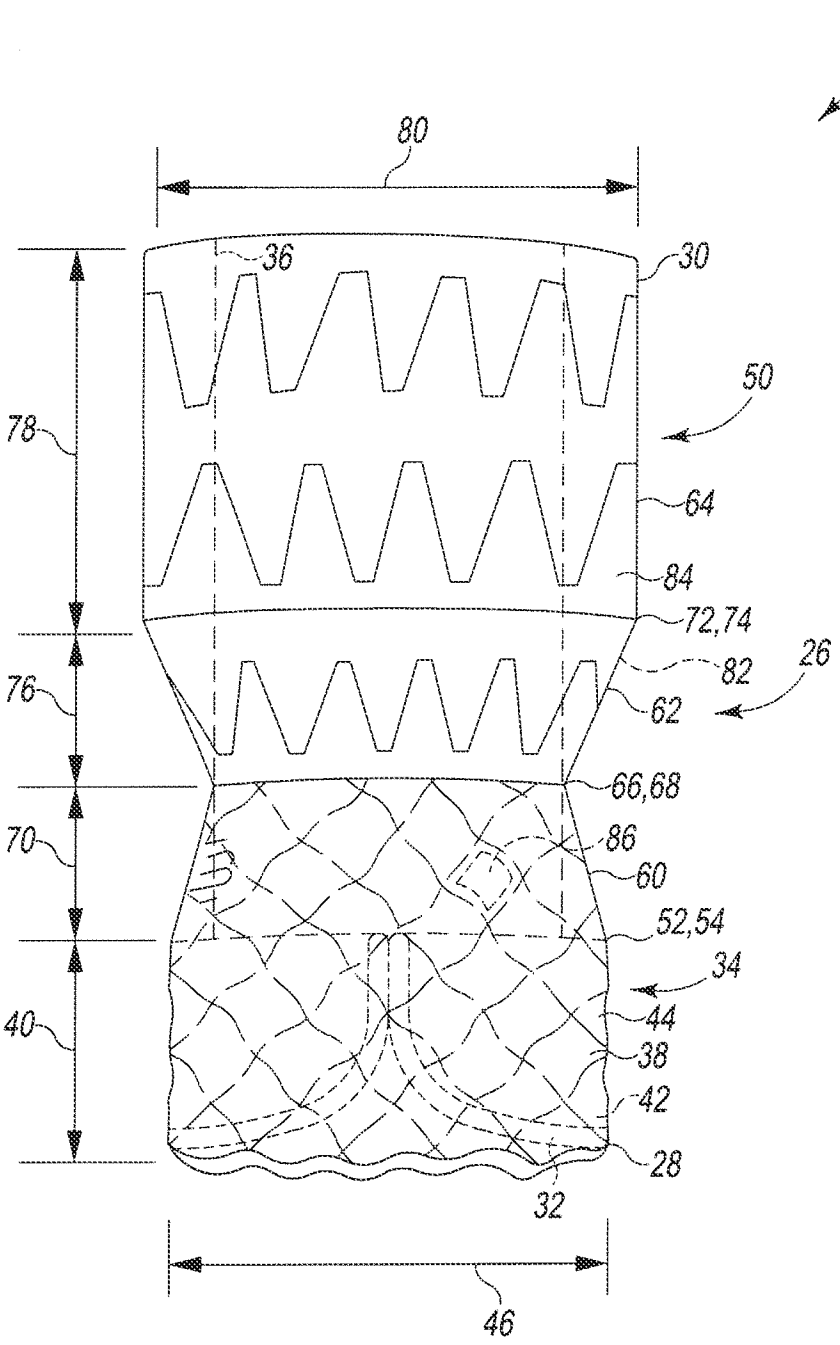

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Fig. 3

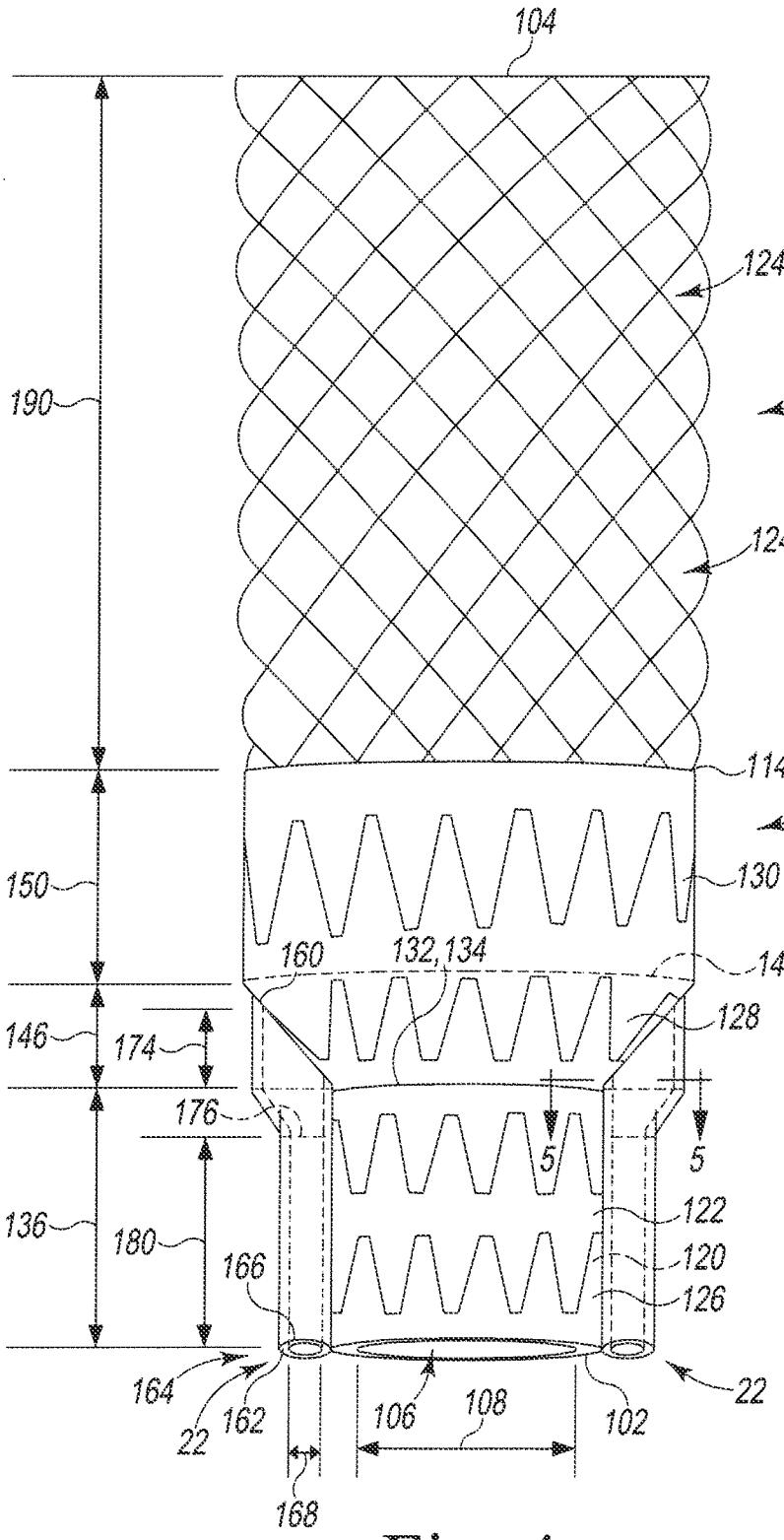

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Fig. 4

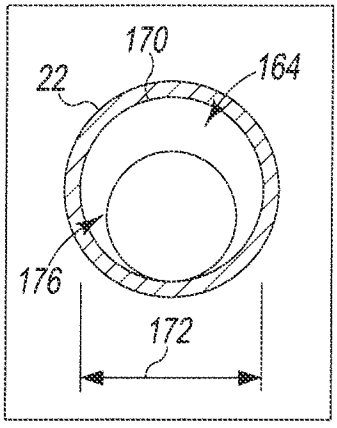

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Fig. 5

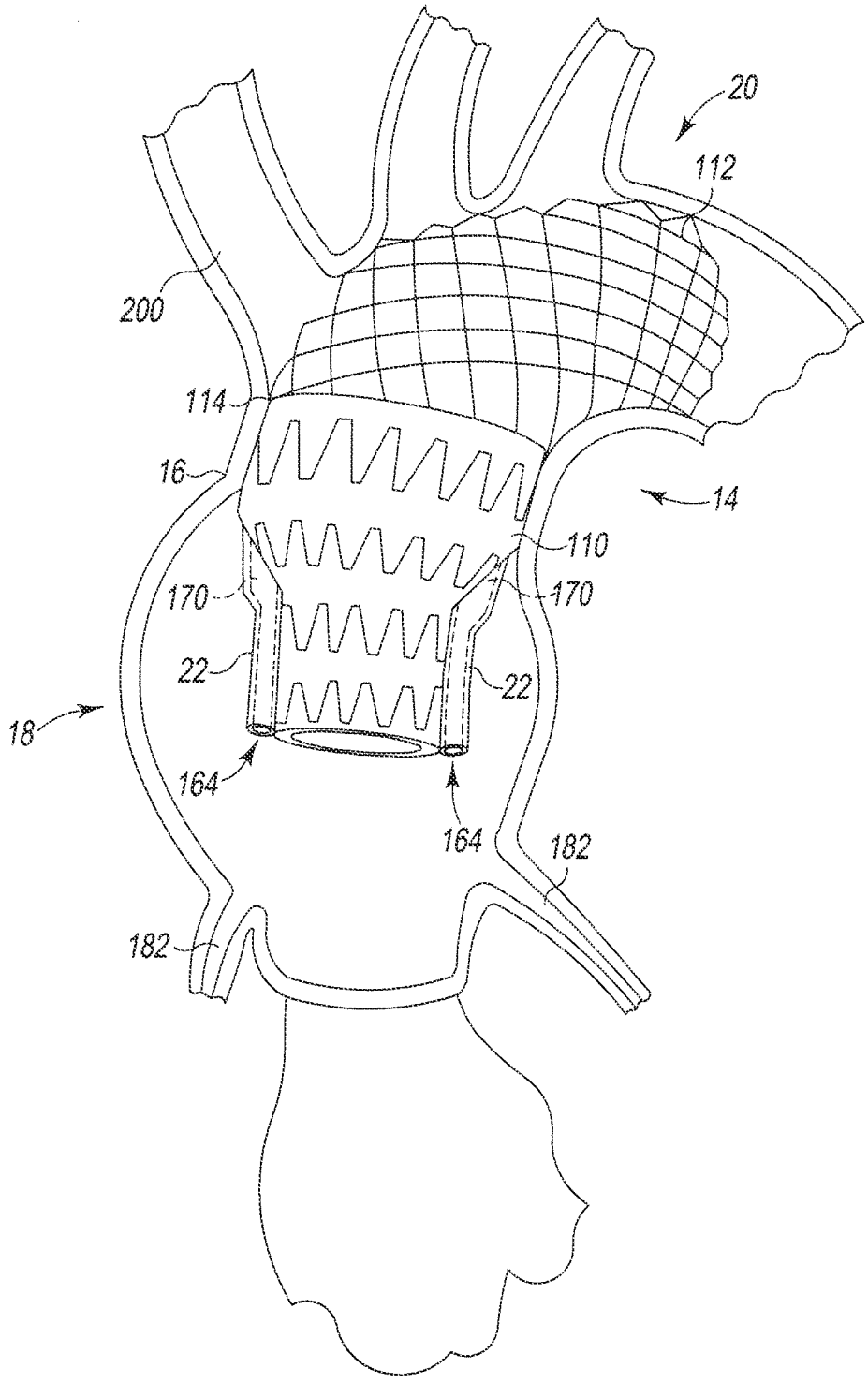


Fig. 6

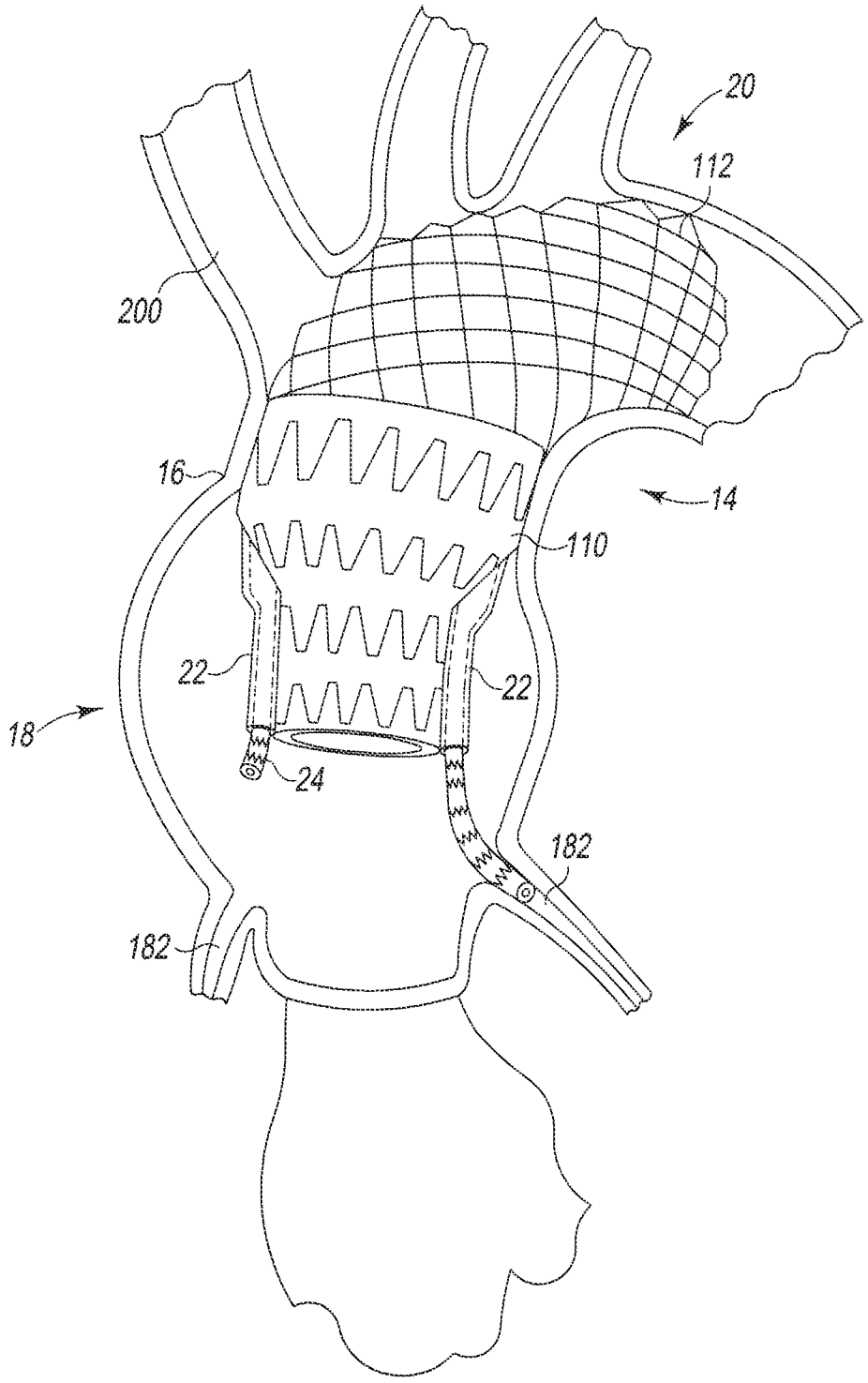


Fig. 7

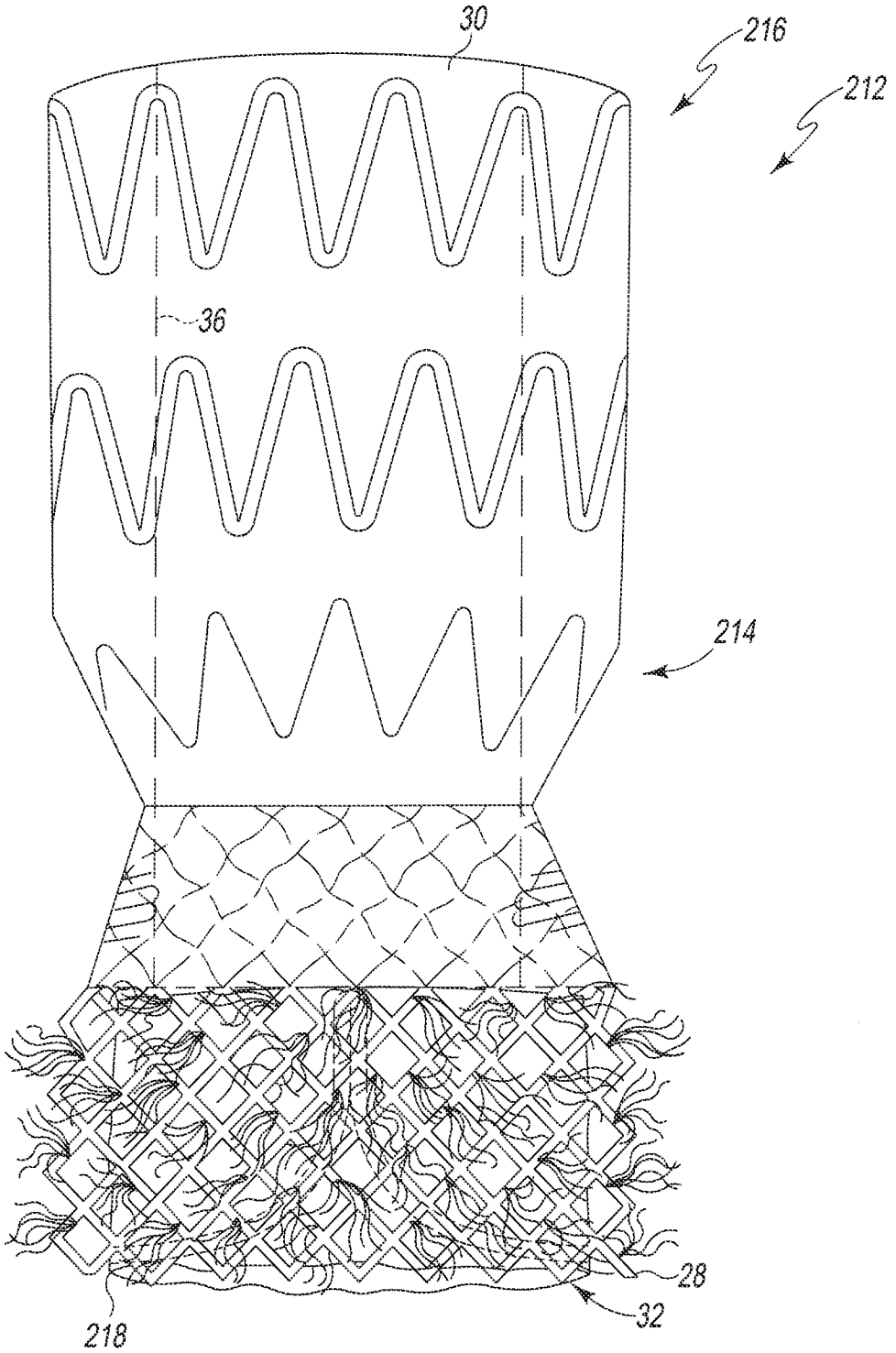


Fig. 8

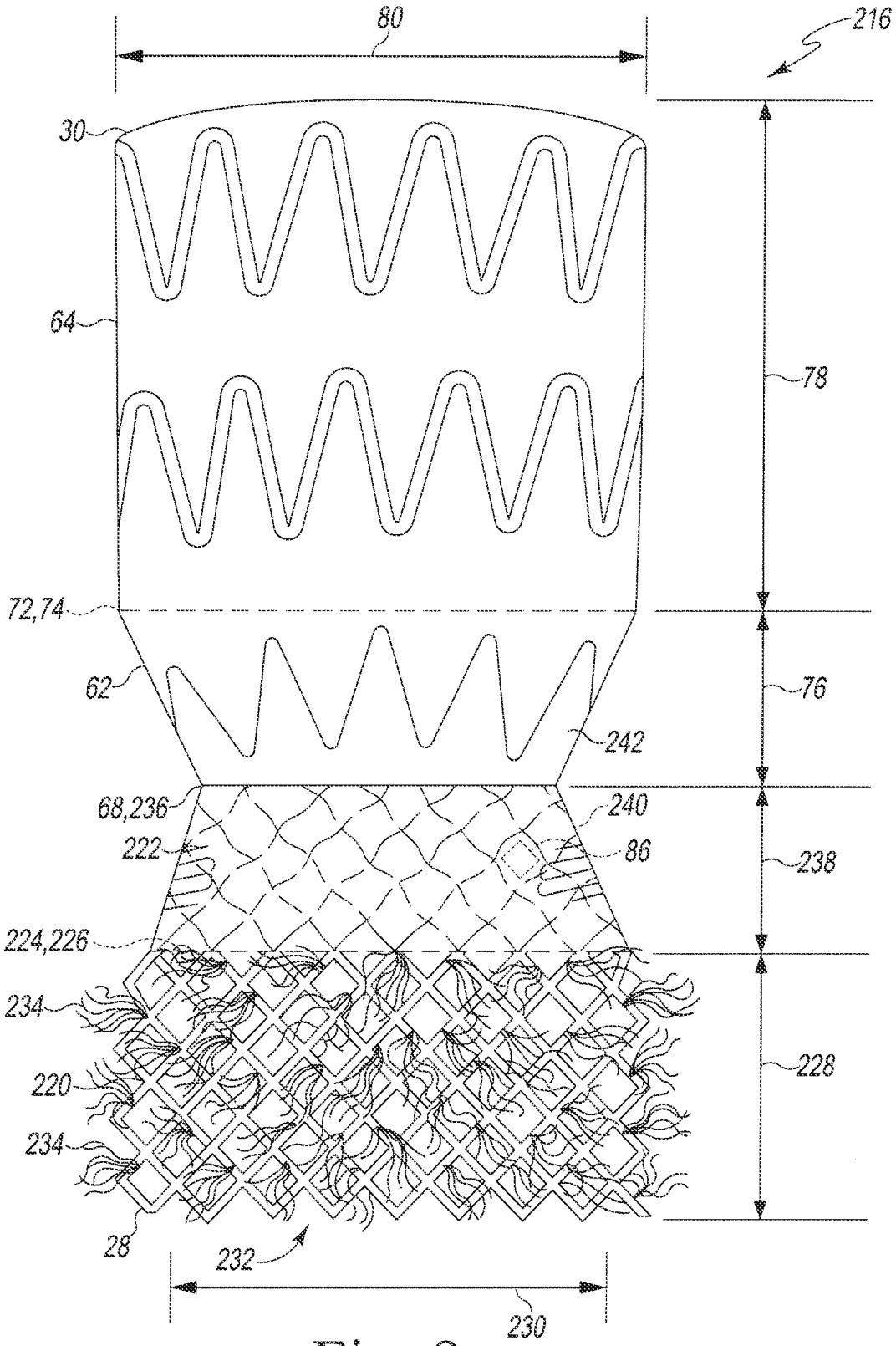

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Fig. 9

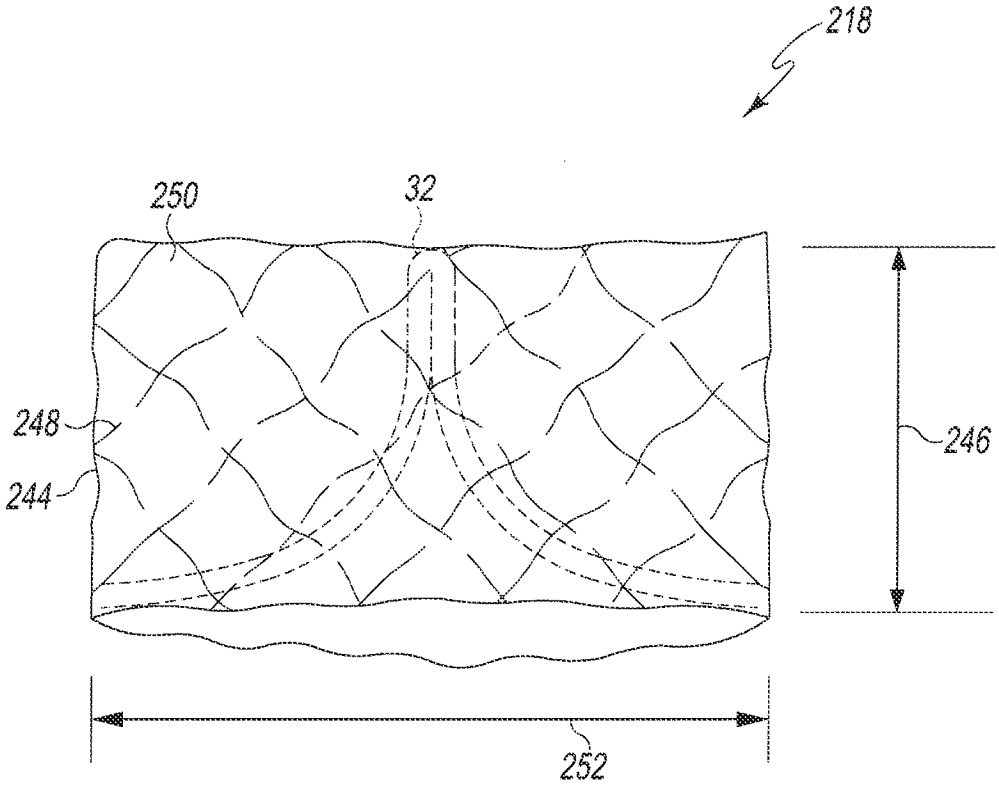


Fig. 10

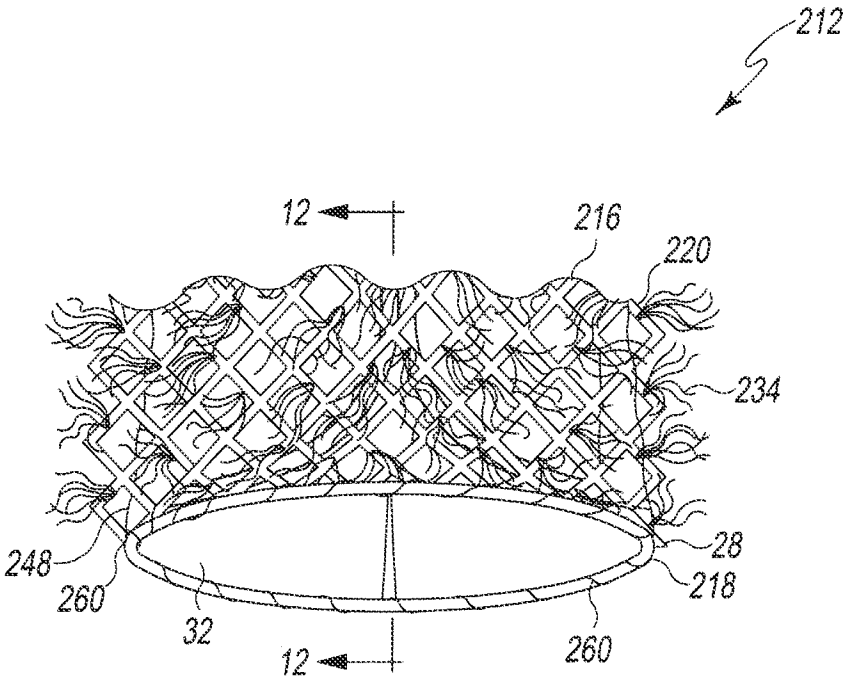


Fig. 11

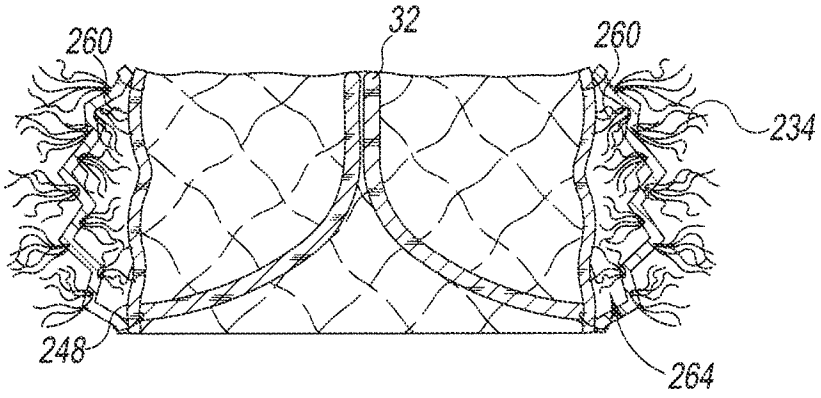


Fig. 12

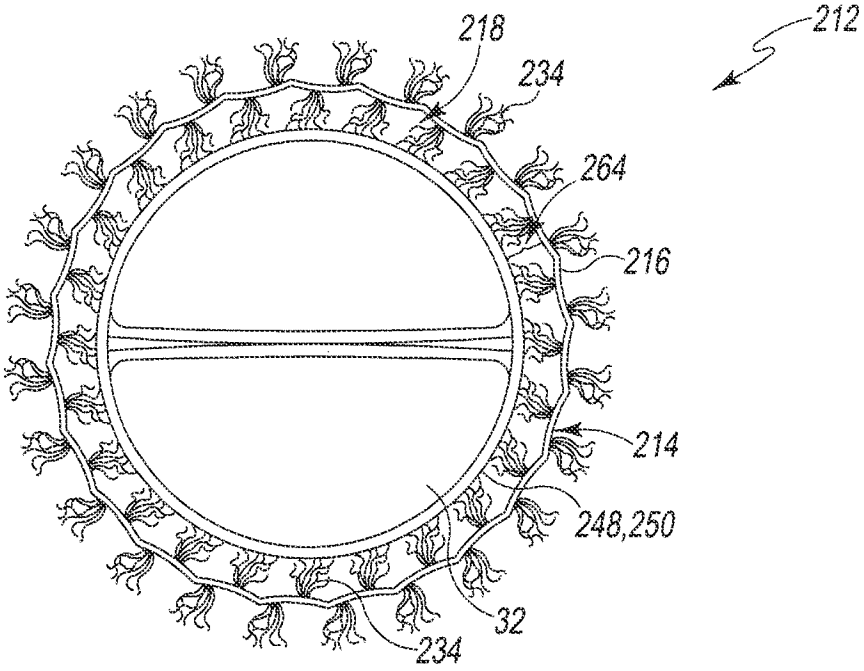

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Fig. 13

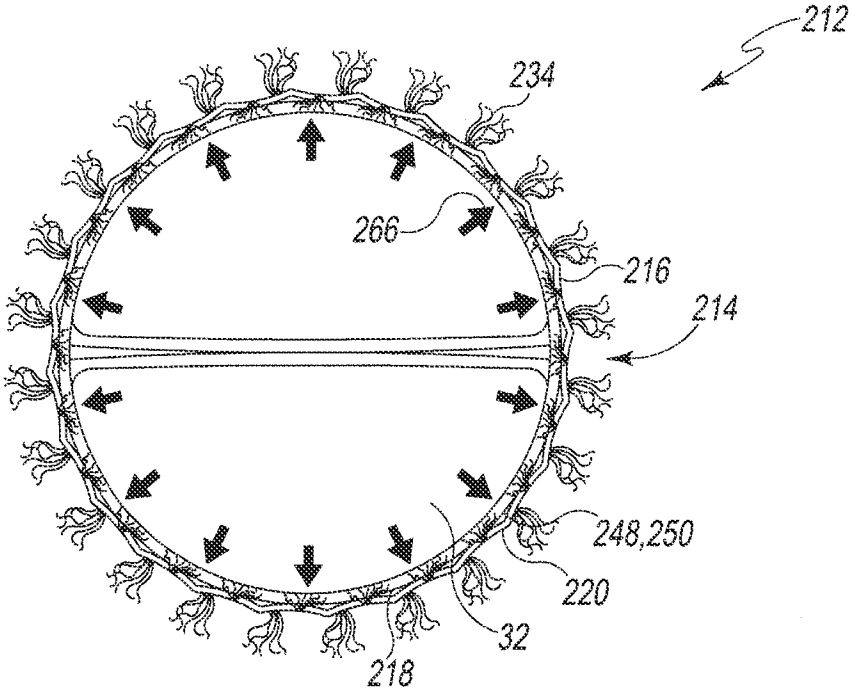

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Fig. 14

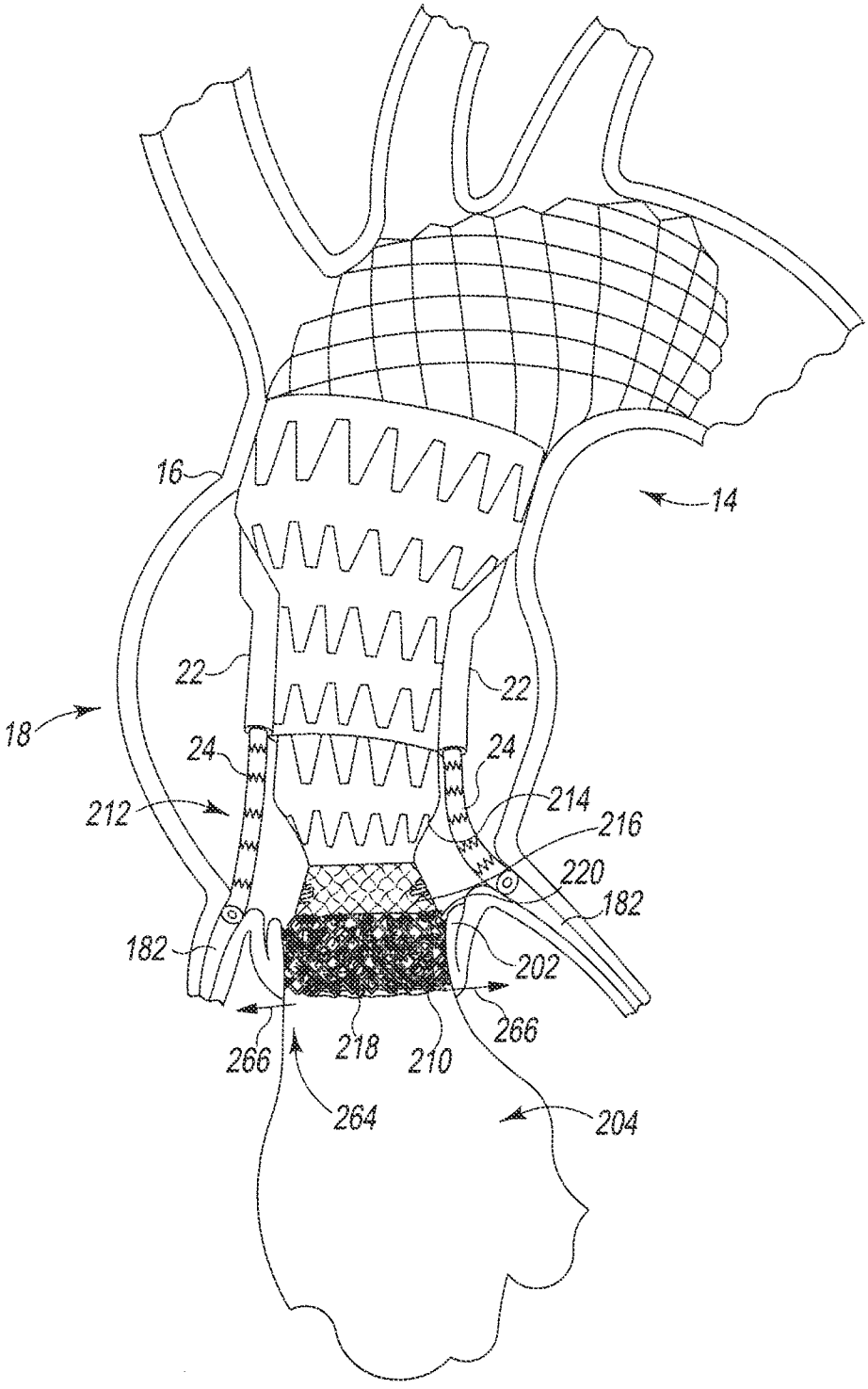

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Fig. 15

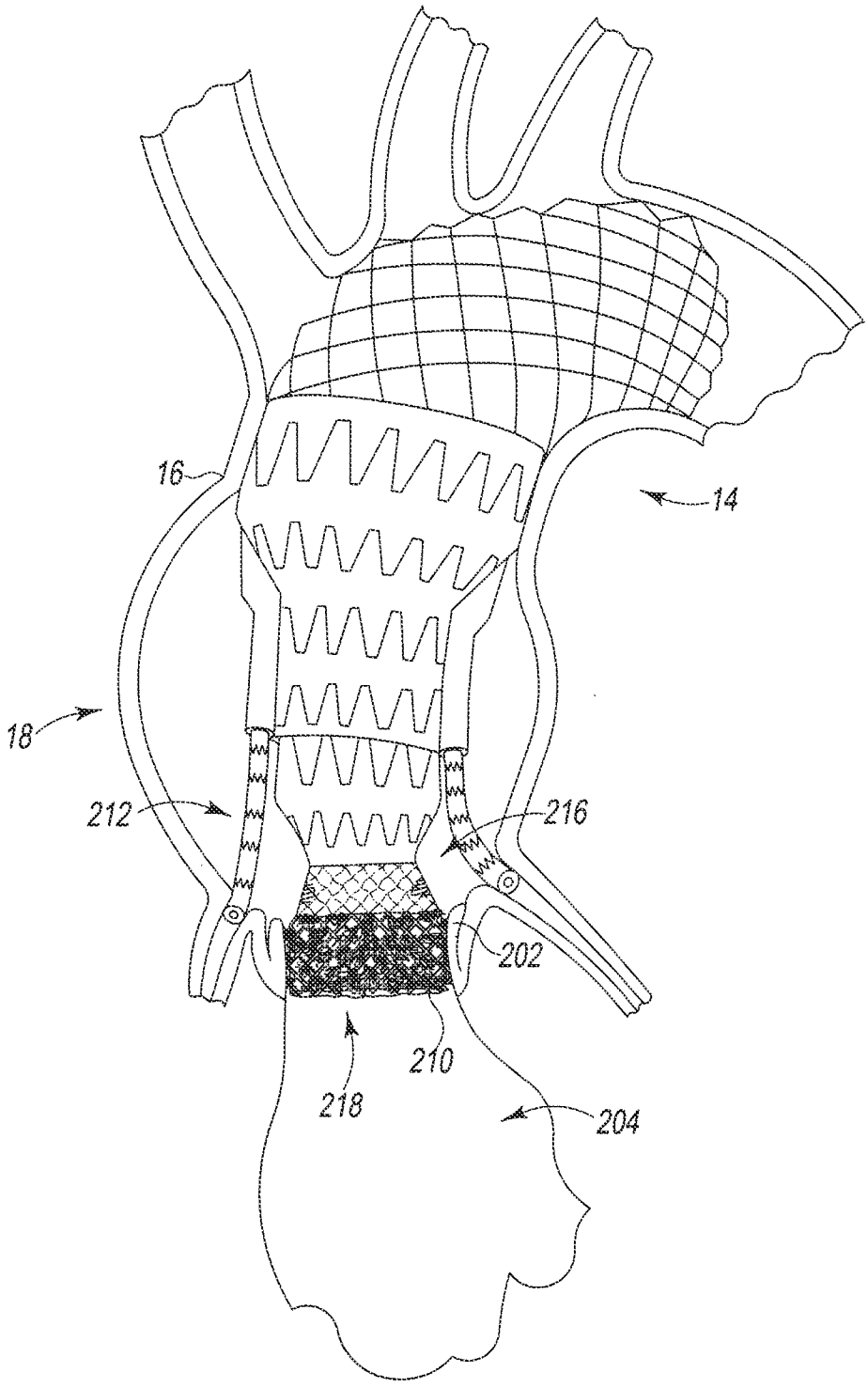


Fig. 16

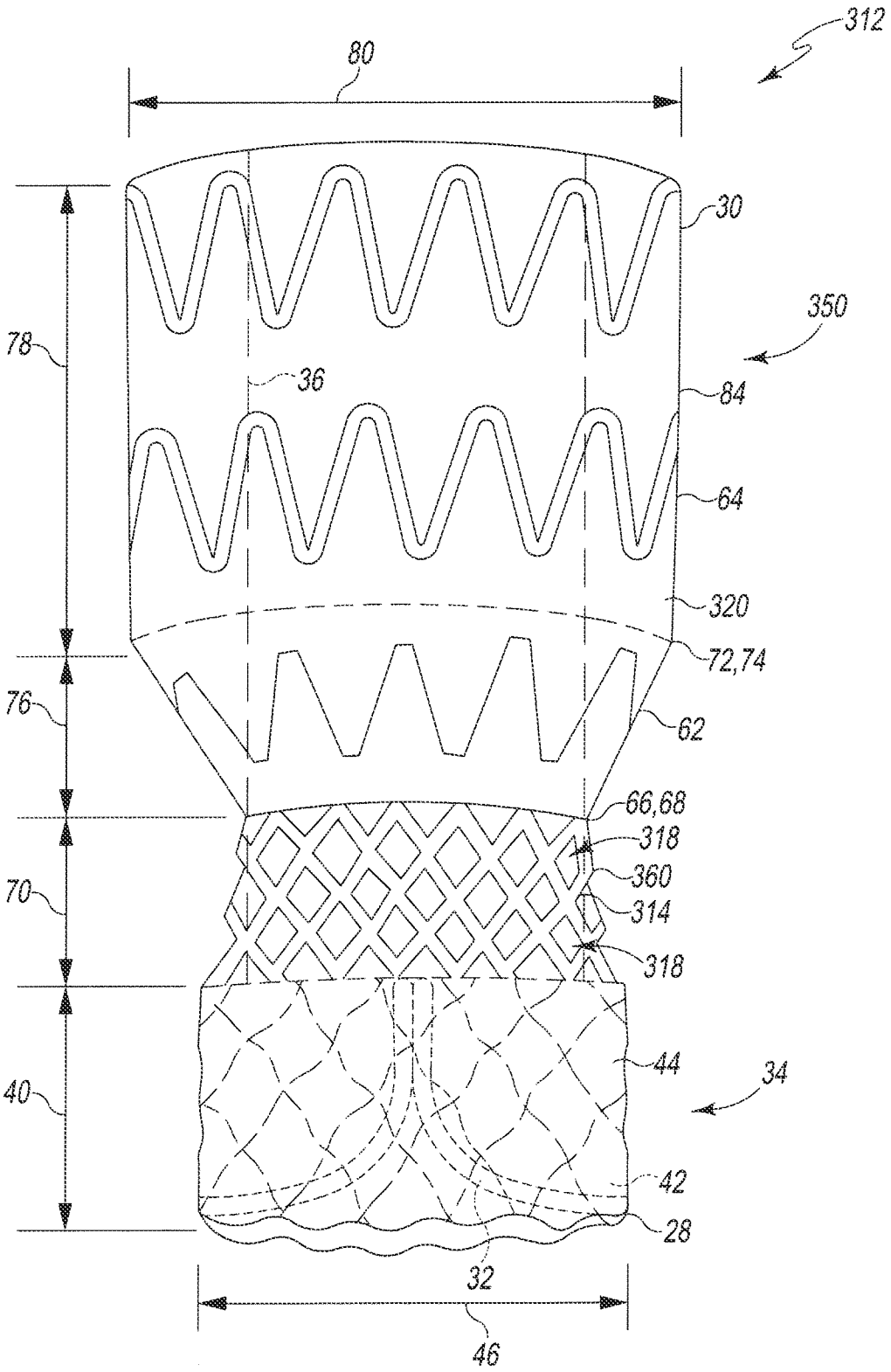

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Fig. 17

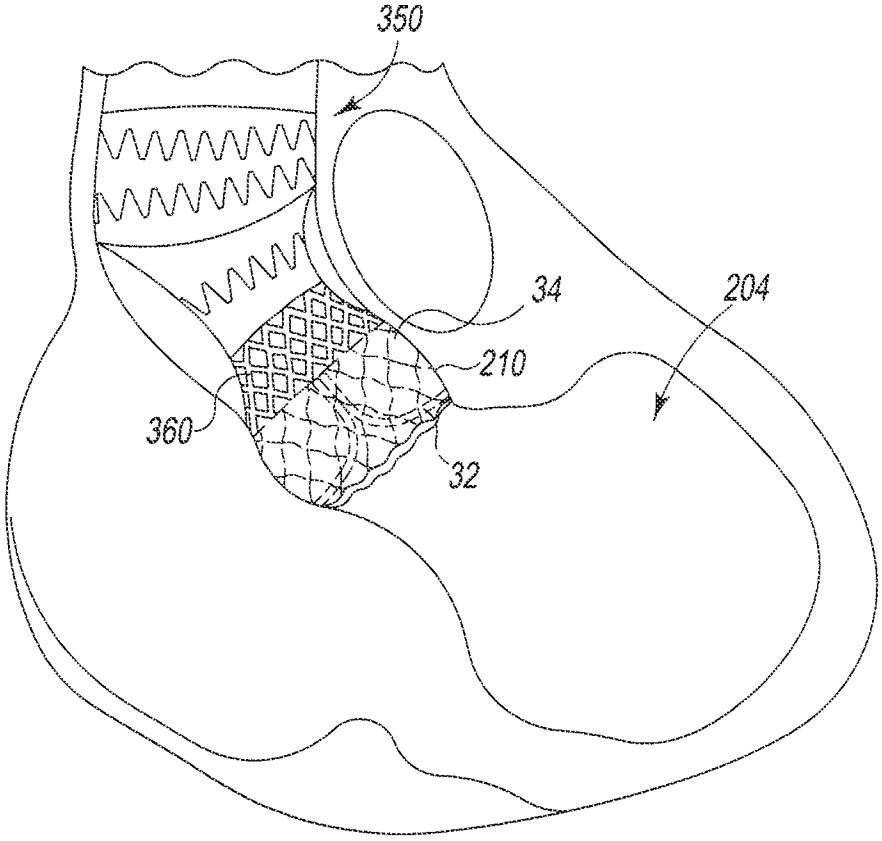


Fig. 18

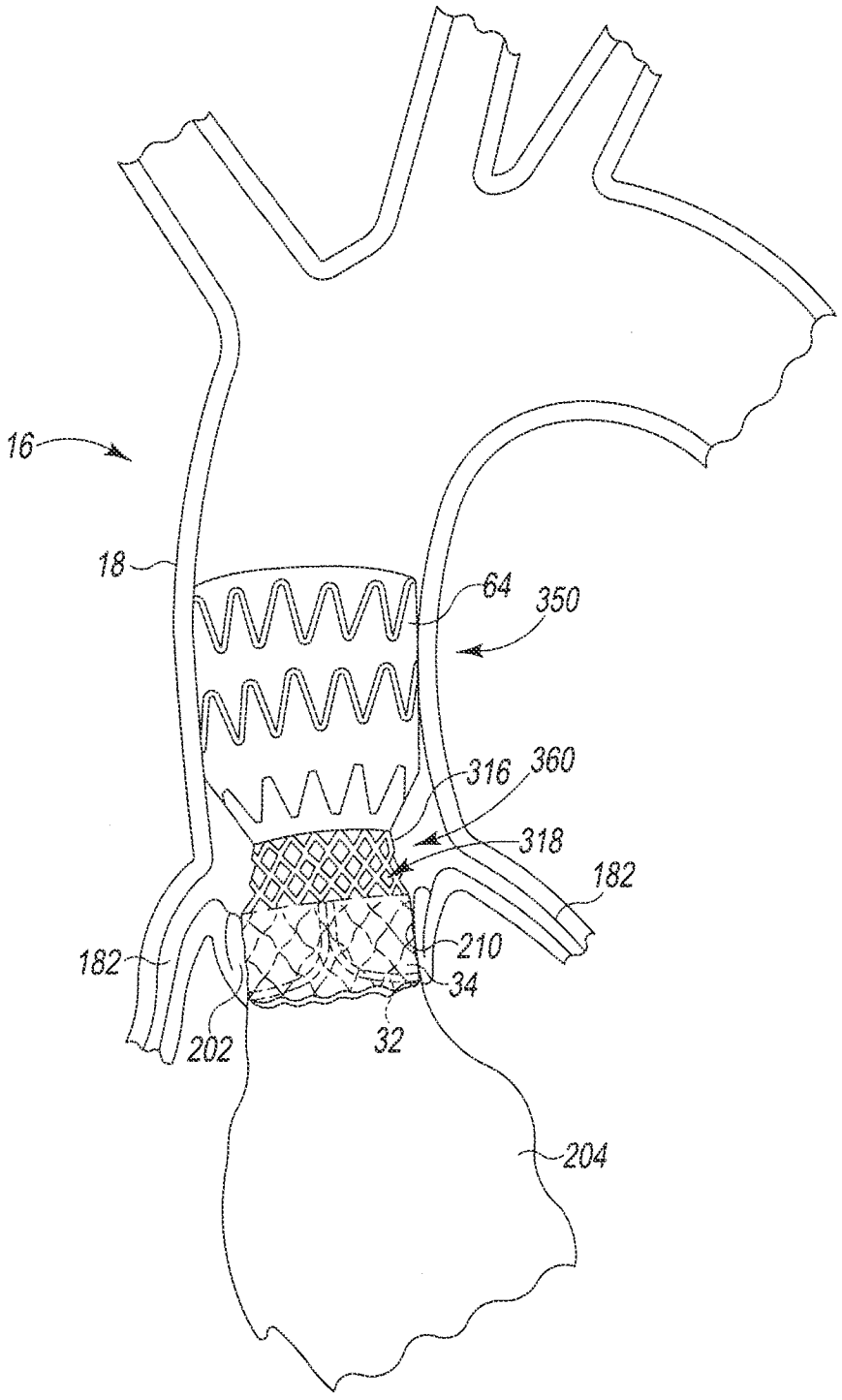


Fig. 19

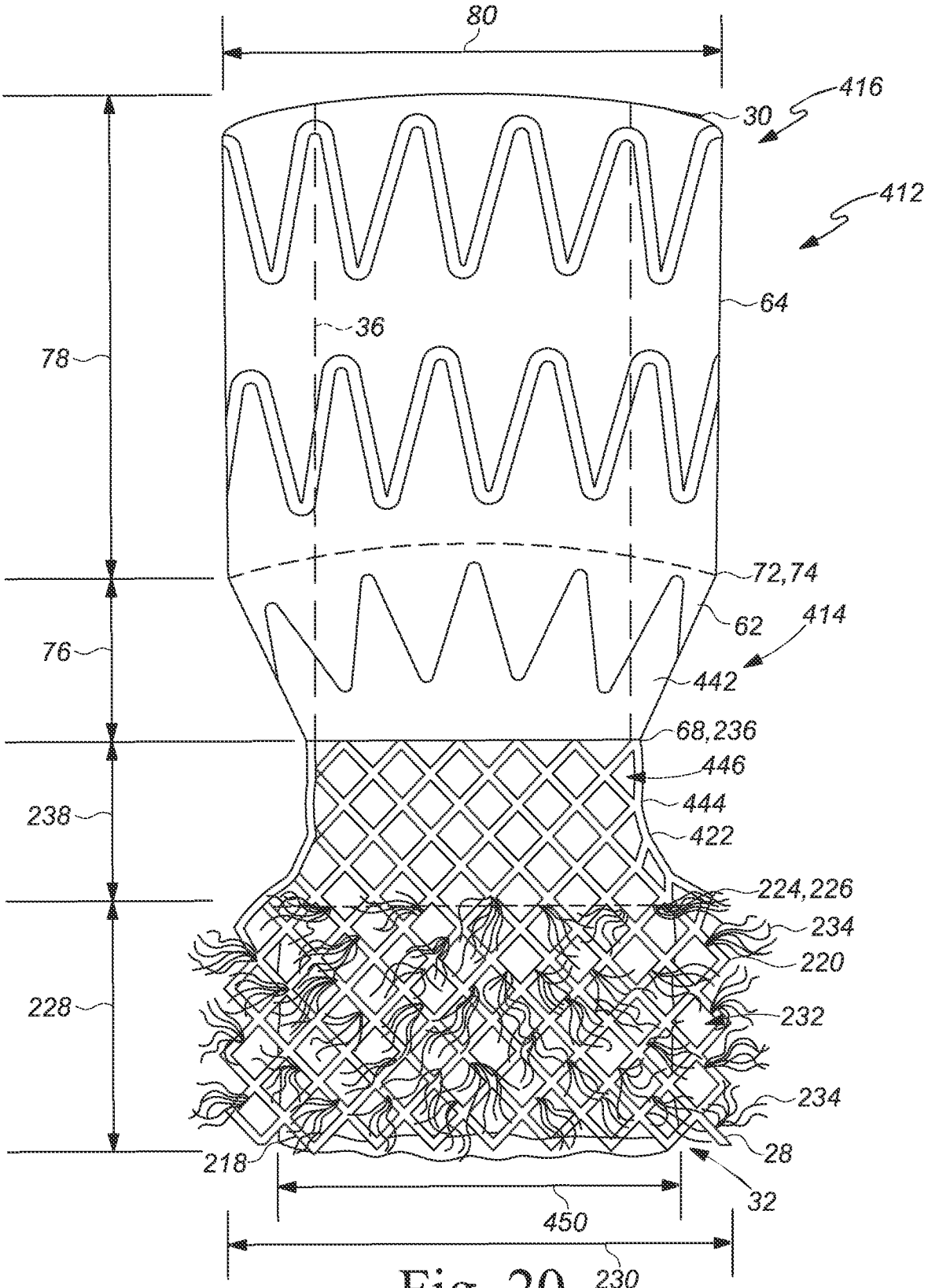

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Fig. 20

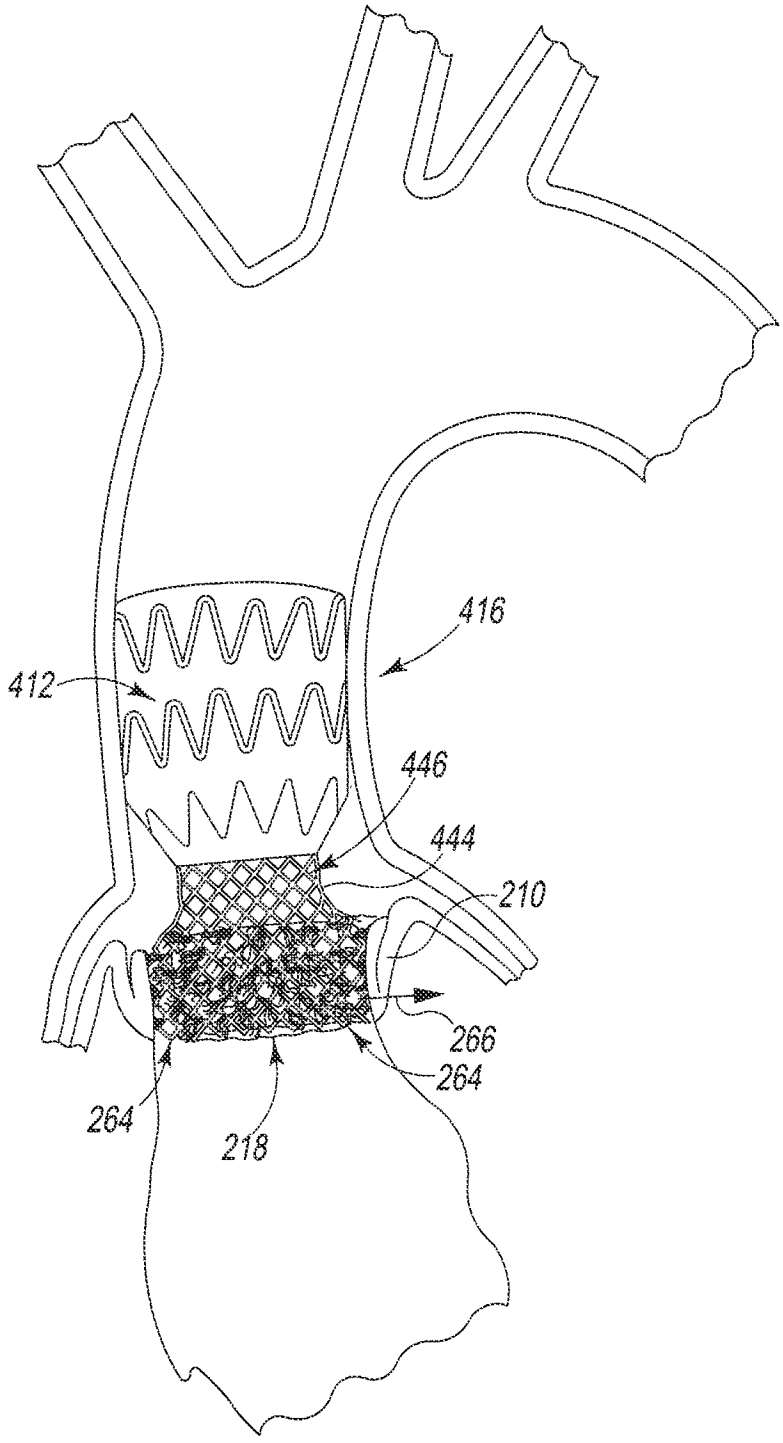


Fig. 21

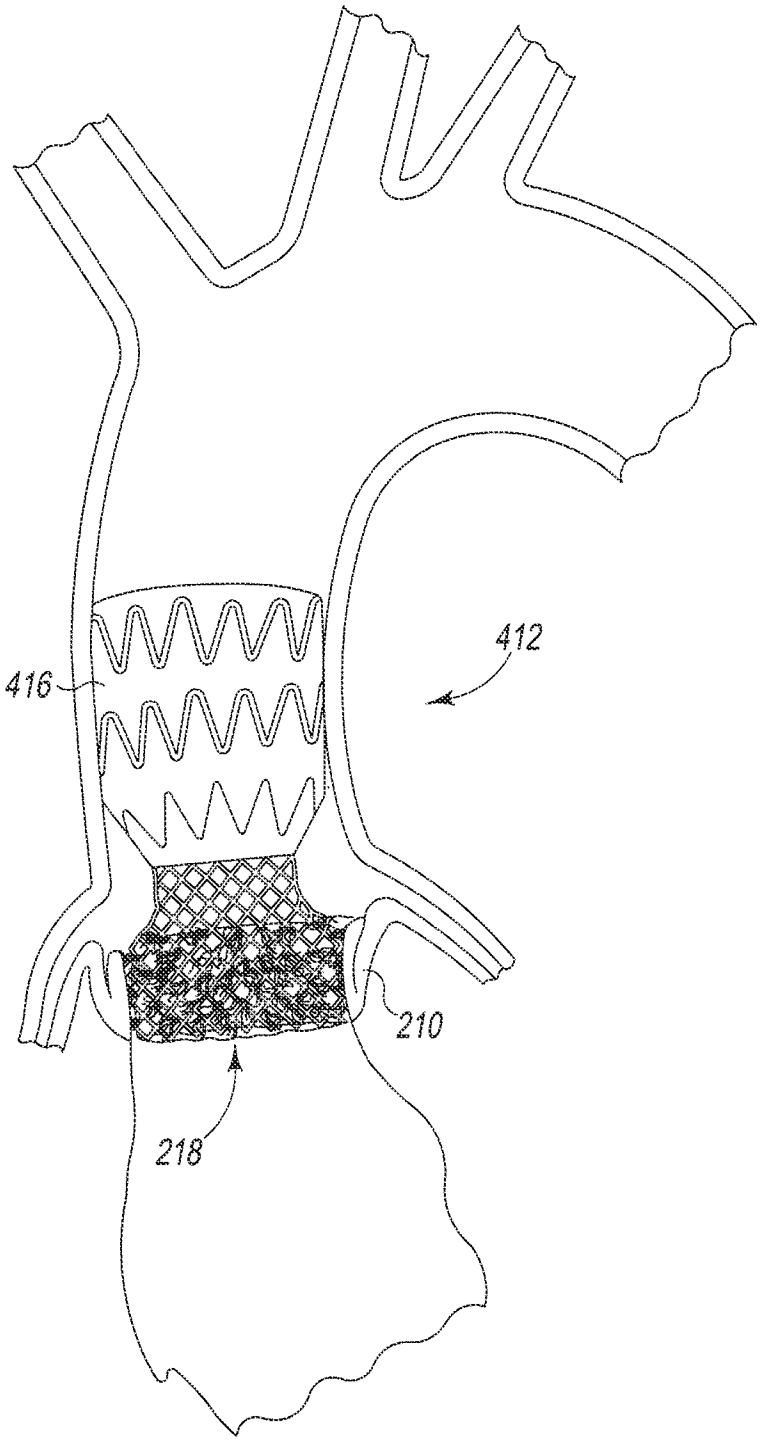


Fig. 22

TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL

[0001] This application is a continuation of U.S. Patent Application no. 17/213,251 entitled TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL, which was filed on March 26, 2021, which is a continuation of U.S. Patent Application No. 17/096,253 entitled "DEVICE FOR ENDOVASCULAR AORTIC REPAIR", which was filed on November 12, 2020, and issued as U.S. Patent No. 10,966,846 on April 6, 2021, which is a continuation of U.S. Patent Application No. 17/060,557 entitled "DEVICE FOR ENDOVASCULAR AORTIC REPAIR", which was filed on October 1, 2020 and issued as U.S. Patent No. 10,888,441 on January 12, 2021, which is a continuation of U.S. Patent Application No. 16/910,189 entitled "DEVICE FOR ENDOVASCULAR AORTIC REPAIR AND METHOD OF USING THE SAME", which was filed on June 24, 2020 and issued as U.S. Patent No. 10,857,011 on December 8, 2020, which is a continuation of U.S. Patent Application No. 16/808,137 entitled "HEART VALVE REPLACEMENT DEVICE FOR ENDOVASCULAR AORTIC REPAIR AND METHOD OF USING THE SAME", which was filed on March 3, 2020 and issued as U.S. Patent No. 10,792,172 on October 6, 2020, which is a continuation of U.S. Patent Application No. 16/736,879 entitled "DEVICE FOR ENDOVASCULAR AORTIC REPAIR AND METHOD OF USING THE SAME", which was filed on January 8, 2020 and issued as U.S. Patent No. 10,842,655 on November 24, 2020, which is a continuation of U.S. Patent Application No. 16/042,286 entitled "DEVICE FOR ENDOVASCULAR AORTIC REPAIR AND METHOD OF USING THE SAME", which was filed on July 23, 2018 and issued as U.S. Patent No. 10,555,823 on February 11, 2020, which is a continuation of U.S. Patent Application No. 14/614,628 entitled "Device for Endovascular Aortic Repair and Method of Using

the Same", which was filed on February 5, 2015 and issued as U.S. Patent No. 10,028,848 on July 24, 2018, which is a continuation of U.S. Patent Application No. 14/569,306 entitled "Device for Endovascular Aortic Repair and Method of Using the Same", which was filed on December 12, 2014 and issued as U.S. Patent No. 9,339,399 on May 17, 2016, which is a divisional of U.S. Patent Application No. 13/706,896 entitled "Device for Endovascular Aortic Repair and Method of Using the Same", which was filed on December 6, 2012 and issued as U.S. Patent No. 8,940,040 on January 27, 2015, which claims the benefit under 35 U.S.C. § 119 to U.S. Provisional Application Serial No. 61/567,458 entitled "Transcathetar Aortic Valve for Endovascular Aortic Repair", which was filed on December 6, 2011. Application No. 13/706,896 also claims priority under § 119 to U.S. Provisional Application Serial No. 61/723,446 entitled "Transcathetar Aortic Valve for Endovascular Aortic Repair", which was filed on November 7, 2012. Each of the applications referenced herein are incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to a device and method of using same for endovascular aortic repair, including repair of aortic valve disease, aortic stenosis, ascending aortic aneurysms, aortic insufficiency, aortic regurgitation, ascending aneurysm, bicuspid valve disease, and/or Type A dissections.

BACKGROUND

[0003] The normal aortic root and the ascending aorta are composed of the aortic annulus, the sinuses of Valsalva, the sinutubular junction, and the tubular portion. The challenge facing practitioners of endovascular repair of ascending aortic aneurysms is that there is a very short proximal landing zone at the level of the sinutubular junction, there is variable coronary anatomy

from patient to patient, and, in many cases, there is involvement of the aortic valve with either stenosis or insufficiency. Generally speaking, and as discussed in the article SURGERY INSIGHT: THE DILATED ASCENDING AORTA — INDICATIONS FOR SURGICAL INTERVENTION, by James E. Davies and Thralf M. Sundt published in Nature Clinical Practice Cardiovascular Medicine (2007), the contents of which are incorporated herein by reference in its entirety, there are three basic types of involvement of the ascending aorta, designated as Type A, B, or C. These will be discussed in further detail below and are shown in FIGS. 1A-1C, which have been reproduced from the referenced article.

[0004] Type A aneurysms are most commonly found in younger patients and patients with connective tissue disorders such as Marfan syndrome. The anatomical characteristics of Type A aneurysms are dilatation of the sinuses of Valsalva with or without dilatation of the aortic annulus. The sinutubular junction is most often dilated. The valve could be normal, stenotic or insufficient. An example of a Type A aneurysm is shown in FIG. 1A.

[0005] The anatomical characteristics of Type B aneurysms are dilatation of the tubular portion. Initially the sinutubular junction may be normal or mildly dilated, however as the aneurysm grows, it stretches the sinutubular junction and may eventually lead to aortic insufficiency. The valve could be normal, stenotic or insufficient. The bulk of the aneurysm is at the level of the tubular aorta. An example of a Type B aneurysm is shown in FIG. 1B.

[0006] The anatomical characteristics of Type C aneurysms are dilatation of the sinuses of Valsalva, sinutubular junction and the tubular portion of the aorta. The valve could be normal, stenotic or insufficient. Type B and C aneurysms are most commonly found in an older group of patients. An example of a Type C aneurysm is shown in FIG. 1C.

[0007] There are devices clinically used for endovascular repair of ascending aortic aneurysms. Although transcatheter valves are a clinical reality, none in clinical use have been designed with the purpose of endovascular repair of multiple types of ascending aortic aneurysms. Indeed, a device is needed that can treat different anatomical variations of ascending aortic aneurysms, create effective proximal and distal seal zones within the aorta, and have a durable valve component, but that also allows for future valve re-interventions. A device is also needed that would allow for treatment of different coronary anatomical variations among the patient population, allow future coronary re-intervention, but that also avoids coronary compression, and enables treatment of possible paravalvular leaks.

SUMMARY

[0008] According to one aspect of the disclosure, an endograft device for endovascular repair of ascending aortic aneurysms is disclosed. The endograft device includes a first prosthetic component that has a proximal frame and a distal frame that is secured to the proximal frame and extends to a distal end of the first prosthetic component. The endograft device also includes at least one conduit that is secured to the first prosthetic component and that is positioned adjacent to the proximal frame, and a second prosthetic component that is secured to a proximal end of the first prosthetic component. The second prosthetic component includes a balloon-expandable frame extending distally from a proximal end of the second prosthetic component and a self-expanding frame that is connected to the balloon-expandable frame and extends to a distal end of the second prosthetic component. The endograft device also includes a valve element that is secured to the balloon-expandable frame at the proximal end of the second prosthetic component.

[0009] In some embodiments, the self-expanding frame may have an hourglass shape. In some embodiments, the self-expanding frame may include a first section that tapers inwardly

between a proximal end and a distal end. The endograft device may also include a second section having a proximal end that is secured to the distal end of the first section. The second section may taper outwardly between the proximal end of the second section and a distal end of the second section. Additionally, in some embodiments, the proximal end of the first section may be connected to a distal end of the balloon-expandable frame.

[0010] In some embodiments, the self-expanding frame may include a third section that extends proximally from the proximal end of the first section. The third section may have a passageway defined therein, and the balloon-expandable frame may be positioned in the passageway of the third section of the self-expanding frame. In some embodiments, the balloon-expandable frame may be expandable between an unexpanded position in which an outer surface of the balloon-expandable frame is spaced apart from an inner surface of the self-expanding frame and an expanded position in which the outer surface of the balloon-expandable frame is engaged with the inner surface of the self-expanding frame.

[0011] In some embodiments, a plurality of fibers may be attached to the third section of the self-expanding frame. When the balloon-expandable frame is in the expanded position, the outer surface of the balloon-expandable frame may be engaged with the plurality of fibers.

[0012] In some embodiments, the proximal frame of the first prosthetic component may have a passageway defined therein, and the distal end of the second prosthetic component may be positioned in the passageway of the first prosthetic component.

[0013] In some embodiments, the conduit may include a pair of conduits positioned on opposite sides of the first prosthetic component. Additionally, in some embodiments, the conduit may have a proximal opening that is positioned adjacent to a proximal end of the first prosthetic component.

[0014] In some embodiments, the proximal frame may include a first section secured to the distal end of the second prosthetic component, and a second section connected to the first section. The second section may taper outward between a proximal end connected to the first section and a distal end. The conduit may have a distal opening defined in the second section of the proximal frame.

[0015] Additionally, in some embodiments, the endograft device may include a stent having a distal end positioned in the proximal opening of the at least one conduit and a proximal end configured to be positioned in a coronary artery.

[0016] In some embodiments, an outer surface of the second prosthetic component and an outer surface of the proximal frame of the first prosthetic component may be covered such that fluid is prevented from passing therethrough. Additionally, an outer surface of the distal frame of the first prosthetic component may be uncovered such that is fluid permitted to pass therethrough.

[0017] According to another aspect, a transcatheter valve is disclosed. The transcatheter valve includes a frame component having a balloon-expandable frame extending distally from a proximal end of the frame component and a self-expanding frame secured to the balloon-expandable frame. The self-expanding frame includes a first section that tapers inwardly between a proximal end and a distal end, and a second section that tapers outwardly between a proximal end secured to the distal end of the first section and a distal end. A valve element is positioned in the balloon-expandable frame at the proximal end of the frame component.

[0018] In some embodiments, the frame component may be a dual-frame component. The self-expanding frame may be an outer frame of the dual-frame component and may have a passageway defined therein. The balloon-expandable frame may be an inner frame of the dual-frame component that is positioned in the passageway defined in the self-expanding frame.

Additionally, the balloon-expandable frame may be expandable between an unexpanded position in which an outer surface of the balloon-expandable frame is spaced apart from an inner surface of the self-expanding frame and an expanded position in which the outer surface of the balloon-expandable frame is engaged with the inner surface of the self-expanding frame.

[0019] In some embodiments, a plurality of fibers may be attached to the self-expanding frame. When the balloon-expandable frame is in the expanded position, the outer surface of the balloon-expandable frame may be engaged with the plurality of fibers. Additionally, in some embodiments, an outer surface of the first section of the self-expanding frame may be uncovered such that fluid is permitted to pass therethrough and an outer surface of the second section of the self-expanding frame may be covered such that fluid is prevented from passing therethrough.

[0020] In some embodiments, the self-expanding frame may include an elongated section extending distally from the second section. The elongated section may have a length that is greater than a combined length of the first section and the second section. Additionally, in some embodiments, the self-expanding frame may be covered with at least one of a collagen and hydrogel. In some embodiments, the valve element may be one of a bicuspid valve and a tricuspid valve.

[0021] According to another aspect, a method of repairing a patient's aorta is disclosed. The method includes introducing a first prosthetic component into the patient's aorta such that a proximal frame of the first prosthetic component is positioned in the ascending aorta and a distal frame of the first prosthetic component is positioned in the aortic arch of the patient's aorta, advancing a covered stent through a conduit defined in the first prosthetic component into a coronary artery of the patient's aorta, securing a second prosthetic component to a proximal end of the first prosthetic component in the patient's aorta, and expanding a proximal section of the

second prosthetic component into engagement with the aortic annulus of the patient's aorta such that a valve secured to the proximal section is positioned in the aortic annulus proximal to the coronary arteries.

[0022] In some embodiments, expanding the proximal section of the second prosthetic component may include operating a balloon-expandable frame. Additionally, in some embodiments, expanding the proximal section of the second prosthetic component may include permitting a self-expanding frame to expand into engagement with the aortic annulus, and operating the balloon-expandable frame may include advancing an outer surface of the balloon-expandable frame into engagement with an inner surface of the self-expanding frame after the self-expanding frame is engaged with the aortic annulus.

[0023] In some embodiments, operating the balloon-expandable frame may include advancing an outer surface of the balloon-expandable frame into engagement with the aortic annulus.

[0024] In some embodiments, an outer surface of the second prosthetic component and an outer surface of the proximal frame of the first prosthetic component may be covered such that fluid is prevented from passing therethrough. Additionally, an outer surface of the distal frame of the first prosthetic component may be uncovered such that is permitted to pass therethrough.

[0025] In some embodiments, introducing the first prosthetic component into the patient's aorta and advancing the covered stent through the conduit defined in the first prosthetic component into the coronary artery of the patient's aorta may be performed during a first surgical procedure. In some embodiments, securing the second prosthetic component to the proximal end of the first prosthetic component and expanding the proximal section of the second prosthetic component into

engagement with the aortic annulus of the patient's aorta may be performed during a second surgical procedure different from the first surgical procedure.

[0026] In some embodiments, the method may also include introducing the second prosthetic component into the ascending aorta prior to introducing the first prosthetic component.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Embodiments of the present disclosure will now be described by way of example in greater detail with reference to the attached figures, in which:

[0028] FIG. 1 is an illustrative aorta;

[0029] FIG. 1A is an example of a Type A aneurysm;

[0030] FIG. 1B is an example of a Type B aneurysm;

[0031] FIG. 1C is an example of a Type C aneurysm;

[0032] FIG. 2 is partial cutaway view of an aorta with an embodiment of an endovascular prosthetic device implanted therein;

[0033] FIG. 3 is an elevation view of a proximal prosthetic component of the endovascular prosthetic device of FIG. 2;

[0034] FIG. 4 is an elevation view of a distal prosthetic component of the endovascular prosthetic device of FIG. 2;

[0035] FIG. 5 is a cross sectional view of the distal prosthetic component of FIG. 4 taken along the line 5-5 in FIG. 4;

[0036] FIG. 6 is a partial cutaway view of the aorta with the distal prosthetic component of FIG. 3 implanted therein;

[0037] FIG. 7 is a view similar to FIG. 6 showing stents extending from the distal prosthetic component;

[0038] FIG. 8 is an elevation view of another embodiment of a proximal prosthetic component of the endovascular prosthetic device of FIG. 2;

[0039] FIG. 9 is an elevation view of a self-expanding outer frame of the proximal prosthetic component of FIG. 8;

[0040] FIG. 10 is an elevation view of a balloon-expandable inner frame of the proximal prosthetic component of FIG. 8;

[0041] FIG. 11 is a perspective view a proximal end of the proximal prosthetic component of FIG. 8;

[0042] FIG. 12 is a cross-sectional elevation view of the proximal prosthetic component of FIG. 8 taken along the line 12-12 in FIG. 11;

[0043] FIG. 13 is a plan view of the proximal prosthetic component of FIG. 8 showing the inner frame in an unexpanded position;

[0044] FIG. 14 is a plan view similar to FIG. 13 showing the inner frame in an expanded position;

[0045] FIG. 15 is a partial cutaway view of the aorta with the distal prosthetic component of FIG. 4 secured to the proximal prosthetic component of FIG. 8;

[0046] FIG. 16 is a view similar to FIG. 15 showing the inner frame in an expanded position;

[0047] FIG. 17 is an embodiment of a transcatheter valve device similar to the proximal prosthetic component of FIG. 3;

[0048] FIGS. 18-19 are partial cutaway views of the aorta with the transcatheter valve of FIG. 17 implanted therein;

[0049] FIG. 20 is another embodiment of a transcatheter valve device similar to the proximal prosthetic component of FIG. 8; and

[0050] FIGS. 21-22 are partial cutaway views of the aorta with the transcatheter valve of FIG. 20 implanted therein.

DETAILED DESCRIPTION OF THE DRAWINGS

[0051] While the concepts of the present disclosure are susceptible to various modifications and alternative forms, specific exemplary embodiments thereof have been illustrated by way of example in the drawings and will herein be described in detail. It should be understood, however, that there is no intent to limit the concepts of the present disclosure to the particular forms disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

[0052] Terms representing anatomical references, such as anterior, posterior, medial, lateral, superior, inferior, distal, proximal, etcetera, may be used throughout the specification in reference to the orthopaedic implants and surgical instruments described herein as well as in reference to the patient's natural anatomy. Such terms have well-understood meanings in both the study of anatomy and the field of orthopaedics. Use of such anatomical reference terms in the written description and claims is intended to be consistent with their well-understood meanings unless noted otherwise. For example, the term "proximal" refers to the direction that is generally closest to the heart, and the term "distal" refers to the direction that is generally furthest from the heart.

[0053] Referring to FIGS. 2-16, exemplary designs of an endovascular prosthetic device or endograft device 10 (hereinafter device 10) are shown. The device 10 is intended for the treatment of most ascending aortic aneurysms and is configured to treat any type of ascending

aneurysm regardless of involvement of the aortic valve and the sinuses of Valsalva. As described in greater detail below, the device 10 permits future coronary and aortic valve interventions as well as extension of a fenestrated/ branch graft into the aortic arch. Part of the device 10 may also be modified and used as a transcatheter valve, as described in greater detail below in regard to FIGS. 17-22. Such a valve may be introduced transfemorally or through the subclavian artery or the apex of the heart.

[0054] Referring now to FIGS. 2-7, the device 10 includes a proximal component 12 that is attached to a distal component 14. As shown in FIG. 2, the distal component 14 may be secured to the proximal component 12 when implanted into a patient's aorta 16. When implanted, the proximal component 12 is positioned in the patient's ascending aorta 18, while the distal component 14 extends distally into the arch 20 of the patient's aorta 16. The distal component 14 includes a pair of "Endo-cabrol conduits" or conduits 22, and each conduit 22 is sized to receive a catheter or stent 24 for coronary blood flow, as described in greater detail below. The device 10 is configured to treat all ascending aneurysms with or without dilated sinutubular junctions and aortic valve disease.

[0055] As shown in FIG. 3, the proximal component 12 includes a frame 26 that extends from a proximal end 28 to a distal end 30. The frame 26 is attached to a valve 32 (shown in phantom), which is positioned at the proximal end 28 of the component 12. In the illustrative embodiment, the valve 32 is configured as a bicuspid valve. It should be appreciated that in other embodiments the valve 32 may be tricuspid or quadracuspid. The valve 32 may be constructed from treated bovine pericardium or other suitable proven biological or synthetic material. When the proximal component 12 is implanted into the patient's aorta 16, the valve 32 replaces the aortic

valve and permits fluid (i.e., blood) to selectively pass from the heart and into a passageway 36 extending through the proximal component 12.

[0056] The valve 32 is housed in a balloon-expandable frame 34 of the frame 26. As shown in FIG. 3, the balloon-expandable frame 34 is embodied as a balloon-expandable stent 38 that extends distally from the proximal end 28 of the component 12 and has a length 40 of approximately 15 mm. In other embodiments, the stent 38 may be longer or shorter depending on, for example, the patient's anatomy. The stent 38 is tubular and is constructed of a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material, in an open-cell configuration. It should be appreciated that in other embodiments the stent 38 may be formed from a polymeric material and may be formed in, for example, a Z-stent configuration. In the illustrative embodiment, the outer surface 42 of the stent 38 is covered with low-profile polyester, ePTFE, or other nonporous covering material 44 that prevents fluid from passing through the outer surface 42. However, it should be appreciated that the stent 38 may be covered with standard polyester or other nonporous materials.

[0057] As shown in FIG. 3, the stent 38 of the balloon-expandable frame 34 has a diameter 46. As described in greater detail below, the balloon-expandable frame 34 is expandable during implantation from an unexpanded diameter (not shown) to the expanded diameter 46. In the illustrative embodiment, the expanded diameter 46 is equal to approximately 26 mm when the frame 34 is expanded. In other embodiments, the expanded diameter may be greater than or less than 26 mm depending on, for example, the patient's anatomy. Examples of balloon-expandable stents are described in U.S. Patent No. 5,102,417 entitled "Expandable Intraluminal Graft, and Method and Apparatus for Implanting an Expandable Intraluminal Graft" by Julio C. Palmaz and U.S. Patent No. 6,582,462 entitled "Valve Prosthesis for Implantation in the Body and a Catheter

for Implanting Such Valve Prosthesis" by Henning Rud Andersen et al., which are expressly incorporated herein by reference. In the illustrative embodiment, the diameter 46 is oversized relative to the diameter of the aortic annulus 210 (see FIG. 1) such that an interference fit is created between the stent 38 and the annulus 210 when the component 12 is implanted and the stent 38 is expanded, as described in greater detail below.

[0058] The balloon-expandable frame 34 is attached to a self-expanding frame 50. In the illustrative embodiment, the distal end 52 of the balloon-expandable frame 34 is secured to the proximal end 54 of the frame 50 by stitching or sewing the frames 34, 50 together, thereby forming the frame 26 of the component 12. It should be appreciated that in other embodiments the frames 34, 50 may be secured together via welding or other fasteners. The frames 34, 50 may also be formed as a single, monolithic frame.

[0059] As shown in FIG. 3, the self-expanding frame 50 has a generally hourglass shape and is formed from a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material. It should be appreciated that in other embodiments the frame 50 may be formed from a polymeric material. The frame 50 includes an inwardly tapered proximal section 60, an outwardly tapered middle section 62, and an elongated distal section 64. The section 60 includes the proximal end 54 of the frame 50 and has a distal end 66 connected to the proximal end 68 of the outwardly tapered middle section 62. The section 60 tapers inwardly between the ends 54, 66 from approximately 26 mm at the end 54 to approximately 22 mm at the end 66. In the illustrative embodiment, the proximal section 60 has a length 70 of approximately 10 mm. It should be appreciated that in other embodiments the dimensions of the section 60 may vary depending on, for example, the patient's anatomy.

[0060] The outwardly tapered middle section 62 of the self-expanding frame 50 has the proximal end 68 and a distal end 72 connected to the proximal end 74 of the elongated distal section 64. The section 62 tapers outwardly from a diameter of approximately 22 mm at the end 68 to a diameter of approximately 28 mm at the end 72. In the illustrative embodiment, the middle section 62 has a length 76 of approximately 10 mm. In other embodiments, the dimensions of the section 62 may vary depending on, for example, the patient's anatomy. Among other things, the tapered sections 60, 62 of the proximal component 12 permit the placement of the stents 24 that extend from the distal component 14 to the coronary arteries, as described in greater detail below.

[0061] The elongated distal section 64 of the self-expanding frame 50 extends distally from the proximal end 74 to the distal end 30 of the component 12. In the illustrative embodiment, the section 64 has a length 78 that is greater than the combined length of the tapered sections 60, 62. In one particular non-limiting example, the length 78 of the elongated distal section 64 is approximately 25 mm and has a diameter 80 of approximately 28 mm. In other embodiments, the dimensions of the section 64 may vary depending on, for example, the patient's anatomy. In one exemplary embodiment, the distal section 64 may taper between the proximal end 74 and the distal end 30.

[0062] As shown in FIG. 3, the proximal section 60 of the self-expanding frame 50 is formed in an open-cell stent configuration, and the sections 62, 64 are formed in a Z-stent configuration. It should be appreciated that in other embodiments the sections 60, 62, 64 may be formed in a single configuration, including an open-cell stent configuration or Z-stent configuration. The sections 60, 62, 64 may also be formed as a single monolithic component. The outer surface 82 of the self-expanding frame 50 is covered with low profile polyester, ePTFE, or other nonporous covering material 84 such that fluid is prevented from passing through the surface

82. In that way, the entire outer surface of the component 12 is covered to prevent fluid from passing therethrough. The covering material 84 immediately distal to the balloon-expandable frame 34 is equipped with a "trap door" 86, which may be opened to permit the passage of one or more surgical instruments for embolization of possible paravalvular leaks. The entire outer surface of component 12 may be also covered with low-profile Dacron or other synthetic material. It should also be appreciated that all or part of the component 12 may be covered with hydrogel or other sealing material.

[0063] As described above, the device 10 also includes a distal component 14, which is secured to the distal end 30 of the proximal component 12 when the device 10 is implanted in the patient's aorta 16. Referring now to FIG. 4, the distal component 14 includes a frame 100 that extends from a proximal end 102 configured to be secured to the proximal component 12 to a distal end 104. The frame 100 has a passageway 106 defined therein, which extends through the ends 102, 104 of the component 14. The passageway 106 has a diameter 108 and is sized to receive the distal end 30 of the proximal component 12 when the device 10 is assembled.

[0064] In the illustrative embodiment, the components 12, 14 are secured together via an interference fit between the frame 100 and the distal end 30 of the proximal component 12. Specifically, the diameter 108 of the passageway 106 is less than the diameter 80 of the proximal component 12. In the illustrative embodiment, the diameter 108 is equal to approximately 26 mm. It should be appreciated that in other embodiments the components 12, 14 may be secured together via stitching or other fastening means.

[0065] As shown in FIG. 4, the component 14 includes a proximal frame 110 that is connected to an elongated distal frame 112. The proximal frame 110 and the distal frame 112 are formed from metallic materials, such as, nitinol, stainless steel, or other implant grade metallic

materials. It should be appreciated that in other embodiments the frames 110, 112 may be formed from a polymeric material. The proximal frame 110 is formed in a Z-stent configuration, and the distal frame 112 is formed in an open-cell configuration. Each of the frames 110, 112 is self-expanding. In the illustrative embodiment, the distal frame 112 is secured to the distal end 114 of the proximal frame 110 by stitching or sewing the frames 110, 112 together. It should be appreciated that in other embodiments the frames 110, 112 may be secured together via welding or other fasteners. The frames 110, 112 may also be formed as a single, monolithic frame.

[0066] The proximal frame 110 has an outer surface 120 that is covered with low profile polyester, ePTFE, or other nonporous covering material 122. As a result, fluid is prevented from passing through the surface 120. The distal frame 112 is uncovered such that fluid is permitted to pass through the openings 124 formed therein.

[0067] As shown in FIG. 4, the proximal frame 110 includes a proximal section 126, an outwardly tapered section 128 extending distally from the proximal section 126, and an elongated distal section 130. The proximal section 126 includes the proximal end 102 of the component 14 and has a distal end 132 connected to the proximal end 134 of the outwardly tapered section 128. In the illustrative embodiment, the proximal section 126 has a length 136 of approximately 25 mm. It should be appreciated that in other embodiments the dimensions of the section 126 may vary depending on, for example, the patient's anatomy.

[0068] The tapered section 128 of the frame 110 has the proximal end 134 and a distal end 140 connected to the proximal end 142 of the elongated distal section 130. The section 128 tapers outwardly from a diameter of approximately 26 mm at the end 132 to a diameter between approximately 44 mm and 48 mm at the end 140. In the illustrative embodiment, the tapered section 128 has a length 146 of approximately 10 mm. It should be appreciated that in other

embodiments the dimensions of the section 128 may vary depending on, for example, the patient's anatomy.

[0069] The elongated distal section 130 of the frame 110 extends distally from the proximal end 142 to the distal end 114 of the frame 110. In the illustrative embodiment, the section 130 has a length 150. In one particular non-limiting example, the length 150 of the elongated distal section 130 is approximately 20 mm. The section 130 also has a diameter 152 of between approximately 44 mm and 48 mm. In other embodiments, the dimensions of the section 130 may vary depending on, for example, the patient's anatomy.

[0070] As described above, the distal component 14 also includes a pair of conduits 22, which are connected to the proximal frame 110. Each conduit 22 has a distal end 160 secured to the tapered section 128 of the frame 110 and a proximal end 162 positioned adjacent to the proximal end 102 of the component 12. As shown in FIG. 4, the conduit 22 does not extend beyond the proximal end 102 of the component 12. Each conduit 22 has a passageway 164 that extends through the ends 160, 162 and is sized to receive a stent 24.

[0071] The passageway 164 has a proximal opening 166 defined in the end 162. The opening 166 has a diameter 168 that in the exemplary embodiment is equal to approximately 5 mm. As shown in FIG. 5, the passageway 164 has a distal opening 170 that is defined in the end 160 and the tapered section 128 of the frame 110. The distal opening 170 has a diameter 172 that is greater than the diameter 168. In the illustrative embodiment, the diameter 172 is equal to approximately 8 mm. The passageway 164 measures approximately 8 mm in diameter over a distance 174 of approximately 5 mm and tapers smoothly into the approximately 5 mm diameter 168 at a junction 176. The passageway 164 maintains the diameter 168 between the junction 176

and the proximal opening 166. In the illustrative embodiment, the passageway 164 has a length 180 of approximately 2 cm between the junction 176 and the proximal opening 166.

[0072] Each conduit 22 is wire reinforced and allows for passage of catheters or stents 24 and easier cannulation of the coronary ostia, regardless of deployment orientation. This configuration allows stenting of the coronary arteries 182 (see FIG. 1) prior to the deployment of component 12, as described in greater detail below. In the illustrative embodiment, the tapered section 128 permits the uncompromised passage of stents 24 into the coronary arteries 182 in such a way that the stents are not compressed between the sinutubular junction and the device 10 itself.

[0073] As shown in FIG. 4, the elongated distal frame 112 of the component 14 extends distally from the distal end 114 of the frame 110 to the distal end 104 of the component 14. In the illustrative embodiment, the frame 112 has a length 190. In one particular non-limiting example, the length 190 of the elongated frame 112 is approximately 10 cm, which is sufficient to cover the arch 20 of the aorta 18 when implanted therein. In other embodiments, the dimensions of the frame 112 may vary depending on, for example, the patient's anatomy. The distal frame 112 permits the accurate deployment of component 14 without compromising the circulation to supra-aortic branches. It also allows for cannulation of the supra-aortic branches, if placement of a fenestrated/ branch arch device is necessary.

[0074] To implant the device 10 in the patient's aorta 16, a surgeon may obtain open exposure or percutaneous access to the common femoral artery. The iliac arteries or an iliac conduit may also be used. After obtaining access and placing a stiff wire in the ascending aorta 18, the device 10 and the delivery system are prepared. In the illustrative embodiment, the delivery system is composed of a 100-105 cm hydrophilic sheath. As shown in FIG. 6, the distal component 14 is delivered first. After performing a lateral oblique thoracic aortogram, the component 14 is

deployed such that the distal end 114 of the proximal frame 110 is positioned proximal to the innominate artery 200, thereby ensuring that the distal openings 170 of the conduits 22 are at 12 and 6 o'clock positions in relationship to the innominate artery 200.

[0075] Using the contralateral common femoral artery wires, standard coronary guide catheters are introduced through the distal frame 112 of the component 14 into each conduit 22. The conduits 22 may then be cannulated with the catheters prior to insertion of the stents 24. Alternatively, the conduits 22 may be pre-cannulated. Using the catheters, access is obtained to the right and left coronary arteries 182. The stents 24 are advanced into the passageways 164 through the distal openings 170 and out of the conduits 22 to bridge the arteries 182 and the conduits 22, as shown in FIG. 7. In that way, each artery 182 is connected to its respective conduit 22. Each stent 24 is covered and may be embodied as a balloon-expandable stent or a self-expanding stent. It should be appreciated that coronary artery bypasses may be performed to the right and left coronary systems prior to the placement of the component 14.

[0076] The proximal component 12 may be deployed after the implantation of the distal component 14. The components 12, 14 may be deployed in a single surgical procedure taking place on a single day or the component 14 may be deployed in one procedure, and the component 12 may be deployed in another, separate procedure at a later date. As shown in FIG. 1, the proximal component 12 is deployed into the position across the native aortic valve 202.

[0077] To do so, a stiff wire is passed through the aortic valve 202 into the left ventricle 204. The delivery system for the proximal component 12 is passed through the valve 202. An example of a delivery system is described in U.S. Patent No. 5,102,417 entitled "Expandable Intraluminal Graft, and Method and Apparatus for Implanting an Expandable Intraluminal Graft" by Julio C. Palmaz, which is incorporated herein by reference. When the delivery system is in

position, the proximal component 12 is released by unsheathing the system, thereby permitting expansion of the self-expanding frame 50. As described above, the self-expanding frame 50 engages the proximal end 102 of the distal component 14 to secure the components 12, 14 together and seal the distal end 30 of the component 12 within the distal component 14. As shown in FIG. 2, the proximal end 28 of the proximal component 12 is positioned in the aortic annulus, and the hour-glass shape of the component 12 provides a space for the native aortic valve leaflets such that the leaflets are not pressed against or over the openings of coronary arteries 182.

[0078] The balloon-expandable frame 34 may be now deployed by inflating the balloon within the delivery system. This deploys the frame 34 to the predetermined expanded diameter 46 and advances the frame 34 into engagement with the aortic annulus 210, thereby sealing the aortic annulus 210 such that fluid is permitted to pass from the left ventricle 204 only through the valve 32. As shown FIG. 1, the valve 32 is positioned in the aortic annulus 210 proximal to the coronary arteries 182. It should be appreciated that the deployment of the component 12 may be performed during rapid ventricular pacing (RVP). In cases with aortic stenosis, the valve 32 may be dilated with balloon angioplasty prior to the introduction of the proximal component 12.

[0079] Referring now to FIGS. 8-16, another embodiment of a proximal component 212 of the device 10 is shown. Some features of the embodiment illustrated in FIGS. 8-16 are substantially similar to those described above in reference to the embodiment of FIGS. 1-7. Such features are designated in FIGS. 8-16 with the same reference numbers as those used in FIGS. 1-7. Similar to the proximal component 12 of FIGS. 1-7, the proximal component 212 may be secured to the distal component 14 when implanted into a patient's aorta 16. When implanted, the proximal component 212 is positioned in the patient's ascending aorta 18, while the distal component 14 extends distally into the arch 20 of the patient's aorta 16.

[0080] As shown in FIG. 8, the proximal component 212 includes a dual-frame 214 that extends from a proximal end 28 to a distal end 30. The frame 214 is attached to a valve 32 (shown in phantom), which is positioned at the proximal end 28 of the component 212. In the illustrative embodiment, the valve 32 is configured as a bicuspid valve. It should be appreciated that in other embodiments the valve 32 may be tricuspid or quadracuspid. The valve 32 may be constructed from treated bovine pericardium or other suitable proven biological or synthetic material. When the proximal component 212 is implanted into the patient's aorta 16, the valve 32 replaces the aortic valve and permits fluid (i.e., blood) to selectively pass from the heart and into a passageway 36 extending through the proximal component 212.

[0081] The dual-frame 214 of the proximal component 212 includes a self-expanding outer frame 216 and a balloon-expandable inner frame 218 that is secured to the self-expanding outer frame 216 and houses the valve 32. Referring now to FIG. 9, the self-expanding outer frame 216 has a generally hourglass shape and is formed from a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material. It should be appreciated that in other embodiments the outer frame 216 may be formed from a polymeric material. The outer frame 216 includes an elongated proximal section 220, an inwardly tapered section 222, an outwardly tapered middle section 62, and an elongated distal section 64.

[0082] The elongated proximal section 220 of the outer frame 216 includes the proximal end 28 of the component 212 and has a distal end 224 connected to a proximal end 226 of the inwardly tapered section 222. The proximal section 220 is embodied as a tubular stent. It should be appreciated that in other embodiments the section 220 may be shaped as a prism, cone, or other geometric shape depending on the patient's anatomy.

[0083] In the illustrative embodiment, the proximal section 220 has a length 228 that is equal to approximately 15 mm. The proximal section 220 also has a diameter 230 of approximately 32 mm. It should be appreciated that in other embodiments the dimensions of the frame 216 may vary according to the anatomy of the patient. In the illustrative embodiment, the diameter 230 is oversized relative to the diameter of the aortic annulus 210 such that an interference fit is created between the proximal section 220 and the annulus 210 when the component 212 is implanted, as described in greater detail below. As shown in FIG. 9, the proximal section 220 defines a passageway 232 in the outer frame 216.

[0084] In the illustrative embodiment, collagen fibers 234 are attached to the proximal section 220 to aid in preventing paravalvular leaks and migration of the proximal component 212 within the aortic walls. The fibers 234 extend outwardly from the proximal section 220 and inwardly into the passageway 232. It should be appreciated that in other embodiments the outer frame 216 may be covered with hydrogel or other sealing materials. In other embodiments, a plurality of barbs or hooks may be attached to the proximal section 220. The hooks may be configured to further engage the tissue of the aorta and inhibit or prevent migration of the device 10.

[0085] The inwardly tapered section 222 of the outer frame 216 includes the proximal end 226 and has a distal end 236 connected to the proximal end 68 of the outwardly tapered middle section 62. The section 222 tapers inwardly between the ends 226, 236 from approximately 32 mm at the end 226 to approximately 22 mm at the end 236. In the illustrative embodiment, the inwardly tapered section 222 has a length 238 of approximately 10 mm.

[0086] The outwardly tapered middle section 62 of the self-expanding frame 216 has the proximal end 68 and a distal end 72 connected to the proximal end 74 of the elongated distal

section 64. The section 62 tapers outwardly from a diameter of approximately 22 mm at the end 68 to a diameter of approximately 28 mm at the end 72. In the illustrative embodiment, the middle section 62 has a length 76 of approximately 10 mm. In other embodiments, the dimensions of the section 62 may vary depending on, for example, the patient's anatomy.

[0087] The elongated distal section 64 of the self-expanding frame 216 extends distally from the proximal end 74 to the distal end 30 of the component 212. In the illustrative embodiment, the section 64 has a length 78 that is greater than the combined length of the tapered sections 60, 62. In one particular non-limiting example, the length 78 of the elongated distal section 64 is approximately 30 mm and has a diameter 80 of approximately 34 mm. In other embodiments, the dimensions of the section 64 may vary depending on, for example, the patient's anatomy. In one exemplary embodiment, the distal section 64 may taper between the proximal end 74 and the distal end 30.

[0088] As shown in FIG. 9, the proximal section 220 and the inwardly tapered section 222 of the self-expanding frame 216 are formed in an open-cell stent configuration, and the sections 62, 64 are formed in a Z-stent configuration. It should be appreciated that in other embodiments the sections 62, 64, 220, 222 may be formed in a single configuration, including an open-cell stent configuration or Z-stent configuration. The sections 62, 64, 220, 222 may also be formed as a single monolithic component. The outer surface 240 of the sections 62, 64, 222 are covered with low profile polyester, ePTFE, or other nonporous covering material 242 such that fluid is prevented from passing through the surface 240. The covering material 242 immediately distal to the proximal section 220 is equipped with a "trap door" 86, which may be opened to permit the passage of one or more surgical instruments for embolization of possible paravalvular leaks. The outer surface 240 of the sections 62, 64, 222 may be also covered with low-profile Dacron or other

synthetic material. It should also be appreciated that all or part of the frame 216 may be covered with hydrogel or other sealing material.

[0089] As described above, the outer frame 216 of the dual-frame 214 is secured to a balloon-expandable inner frame 218, which is positioned in the passageway 232. As shown in FIG. 10, the frame 218 houses the valve 32. The balloon-expandable frame 218 is embodied as a balloon-expandable tubular stent 244 that has a length 246 of approximately 15 mm. In other embodiments, the stent 244 may be longer or shorter depending on, for example, the patient's anatomy. The stent 244 is tubular and is constructed of a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material, in an open-cell configuration. It should be appreciated that in other embodiments the stent 244 may be formed from a polymeric material and may be formed in, for example, a Z-stent configuration. In the illustrative embodiment, the outer surface 248 of the stent 244 is covered with low-profile polyester, ePTFE, or other nonporous covering material 250 that prevents fluid from passing through the outer surface 248. However, it should be appreciated that the stent 244 may be covered with standard polyester, ePTFE or other nonporous materials.

[0090] As shown in FIG. 10, the stent 244 of the inner frame 218 has a diameter 252. As described in greater detail below, the balloon-expandable frame 218 is expandable during implantation from an unexpanded diameter (not shown) to the expanded diameter 252. In the illustrative embodiment, the expanded diameter 252 is equal to approximately 26 mm when the inner frame 218 is expanded. In other embodiments, the expanded diameter may be equal to, or greater than, the diameter 230 of the proximal section 220 of the outer frame 216. In the illustrative embodiment, the expanded diameter 252 is oversized relative to the diameter of the aortic annulus 210 such that an interference fit is created between the proximal section 220 and the annulus 210

when the component 212 is implanted, and the inner frame 218 is expanded, as described in greater detail below.

[0091] Referring now to FIG. 11, the inner frame 218 of the dual-frame component 214 is secured to the outer frame 216 via a plurality of stitches 260. It should be appreciated that in other embodiments soldering, welding or other fasteners may be used to secure the inner frame 218 to the outer frame 216. As shown in FIGS. 11-14, the inner frame 218 and the valve component 32 are positioned in the passageway 232 defined in the self-expanding frame 216. When the inner frame 218 is unexpanded, the outer surface 248 of the stent 244 is spaced apart from the fibers 234 attached to the outer frame 216. In the illustrative embodiment, a gap 264 is defined therebetween, and the gap 264 has a magnitude of about 2 mm to about 3 mm.

[0092] As shown in FIG. 14, the balloon-expandable inner frame 218 may be expanded in the direction indicated by arrows 266. As described above, the diameter 230 of the proximal section 220 of the outer frame 216 is oversized relative to the diameter of the aortic annulus 210. As such, when the component 212 is implanted, the proximal section 220 is reduced to the diameter of the annulus 210. Because the expanded diameter 252 of the stent 244 is greater than the diameter of the annulus, the outer surface 248 of the stent 244 engages the fibers 234 (and hence the inner surface of the proximal section 220 of the outer frame 216) through the covering material 250. In that way, the gap 264 is closed, and the fibers 234 and the covering material 250 create a seal between the inner frame 218 and the outer frame 216.

[0093] To implant an endograft device 10 that includes proximal component 212 in the patient's aorta 16, a surgeon may obtain open exposure or percutaneous access to the common femoral artery. The surgeon may then implant the distal component 14 in the manner described above in regard to FIGS. 1-7 and advance the stents 24 into position in the arteries 182. The

proximal component 212 may be deployed after the implantation of the distal component 14. To do so, a stiff wire is passed through the aortic valve 202 into the left ventricle 204. The delivery system for the proximal component 212 is then passed through the valve 202.

[0094] When the delivery system is in position, the proximal component 212 is released by unsheathing the system, thereby permitting expansion of the self-expanding frame 216. The self-expanding frame 216 engages the proximal end 102 of the distal component 14 to secure the components 212, 14 together and seal the distal end 30 of the component 212 within the distal component 14.

[0095] When the frame 216 is unsheathed, the proximal section 220 expands into engagement with the aortic annulus 210, thereby creating an interference fit between the frame 216 and the annulus 210 and stabilizing the device 10 in place. As shown in FIG. 15, the inner frame 218 is initially unexpanded within the outer frame 216. The inner frame 218 may be deployed by expanding the balloon assembly. Expansion of the balloon-expandable inner frame 218 engages the inner frame 218 with the outer frame 216 and compresses the collagen fiber/hydrogel coated proximal section 220 of the outer frame 216 against the aortic annulus 210. As shown in FIG. 16, the combined engagement of the frames 216, 218 seals the annulus 210 and the paravalvular areas, and thus, prevents paravalvular leakage. As such, fluid is permitted to pass from the left ventricle 204 only through the valve 32 of the component 212. As shown FIGS. 15-16, the valve 32 is positioned in the aortic annulus 210 proximal to the coronary arteries 182. It should be appreciated that the deployment of the component 212 may be performed during rapid ventricular pacing (RVP). In cases with aortic stenosis, the valve 32 may be dilated with balloon angioplasty prior to the introduction of the proximal component 212.

[0096] In each of the embodiments described above, the self-expanding frame portion of proximal components 12, 212 significantly improves the accuracy and control of the deployment of the device 10. The bicuspid configuration of the valve 32 serves three distinct purposes, including (1) by reducing the number of valve commissures to two, the profile will be reduced, (2) the valve 32 may conform better to the aortic annulus, and (3) when the annulus is asymmetrical, the incidence of aortic insufficiency may be reduced.

[0097] Referring now to FIGS. 17-22, the proximal component 12 or the proximal component 212 may be used as a transcatheter valve with slight modification. Such a valve may be deployed via a transfemoral or trans-axillary route, as will be described in further detail below.

[0098] Referring now to FIGS. 17-19, one embodiment of a transcatheter valve component 312 is shown. Some features of the embodiment illustrated in FIGS. 17-19 are substantially similar to those described above in reference to the proximal component 12 of FIGS. 1-7. Such features are designated in FIGS. 17-19 with the same reference numbers as those used in FIGS. 1-7. Similar to the proximal component 12 of FIGS. 1-7, the transcatheter valve component 312 includes a frame 26 that extends from a proximal end 28 to a distal end 30. The frame 326 is attached to a valve 32 (shown in phantom), which is positioned at the proximal end 28 of the valve component 312. When the valve component 312 is implanted into the patient's aorta 16, the valve 32 replaces the aortic valve and permits fluid (i.e., blood) to selectively pass from the heart and into a passageway 36 extending through the valve component 312.

[0099] The valve 32 is housed in a balloon-expandable frame 34 of the frame 26. As shown in FIG. 17, the balloon-expandable frame 34 is embodied as a balloon-expandable stent 38 that extends distally from the proximal end 28 of the transcatheter valve component 312 and has a length 40 of approximately 15 mm. In other embodiments, the stent 38 may be longer or shorter

depending on, for example, the patient's anatomy. The stent 38 is tubular and is constructed of a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material, in an open-cell configuration. It should be appreciated that in other embodiments the stent 38 may be formed from a polymeric material and may be formed in, for example, a Z-stent configuration. In the illustrative embodiment, the outer surface 42 of the stent 38 is covered with low-profile polyester, ePTFE, or other nonporous covering material 44 that prevents fluid from passing through the outer surface 42. However, it should be appreciated that the stent 38 may be covered with standard polyester, ePTFE or other nonporous materials.

[00100] As shown in FIG. 17, the stent 38 of the balloon-expandable frame 34 has a diameter 46. As described in greater detail below, the balloon-expandable frame 34 is expandable during implantation from an unexpanded diameter (not shown) to the expanded diameter 46. In the illustrative embodiment, the expanded diameter 46 is equal to approximately 26 mm when the frame 34 is expanded. In other embodiments, the expanded diameter may be greater than or less than 26 mm depending on, for example, the patient's anatomy. In the illustrative embodiment, the diameter 46 is oversized relative to the diameter of the aortic annulus 210 such that an interference fit is created between the stent 38 and the annulus 210 when the transcatheter valve component 312 is implanted.

[00101] The balloon-expandable frame 34 is attached to a self-expanding frame 350. In the illustrative embodiment, the distal end 52 of the balloon-expandable frame 34 is secured to the proximal end 54 of the frame 350 by stitching or sewing the frames 34, 350 together, thereby forming the frame 26 of the transcatheter valve component 312. It should be appreciated that in other embodiments the frames 34, 350 may be secured together via welding or other fasteners. The frames 34, 350 may also be formed as a single, monolithic frame.

[00102] As shown in FIG. 17, the self-expanding frame 350 has a generally hourglass shape and is formed from a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material. It should be appreciated that in other embodiments the frame 350 may be formed from a polymeric material. The frame 350 includes an inwardly tapered proximal section 360, an outwardly tapered middle section 62, and an elongated distal section 64. The section 360 includes the proximal end 54 of the frame 350 and has a distal end 66 connected to the proximal end 68 of the outwardly tapered middle section 62. The section 360 tapers inwardly between the ends 54, 66 from approximately 26 mm at the end 54 to approximately 22 mm at the end 66. In the illustrative embodiment, the proximal section 360 has a length 70 of approximately 15 mm.

[00103] The outwardly tapered middle section 62 of the self-expanding frame 350 has the proximal end 68 and a distal end 72 connected to the proximal end 74 of the elongated distal section 64. The section 62 tapers outwardly from a diameter of approximately 22 mm at the end 68 to a diameter of approximately 28 mm at the end 72. In the illustrative embodiment, the middle section 62 has a length 76 of approximately 10 mm. In other embodiments, the dimensions of the section 62 may vary depending on, for example, the patient's anatomy.

[00104] The elongated distal section 64 of the self-expanding frame 350 extends distally from the proximal end 74 to the distal end 30 of the valve component 312. In the illustrative embodiment, the section 64 has a length 78 that is greater than the combined length of the tapered sections 60, 62. In one particular non-limiting example, the length 78 of the elongated distal section 64 is approximately 30 mm and has a diameter 80 of approximately 34 mm. In other embodiments, the dimensions of the section 64 may vary depending on, for example, the patient's anatomy. In one exemplary embodiment, the distal section 64 may taper between the proximal end 74 and the distal end 30.

[00105] As shown in FIG. 3, the proximal section 360 of the self-expanding frame 350 is formed in an open-cell stent configuration, and each of the sections 62, 64 is formed in a Z-stent configuration. It should be appreciated that in other embodiments the sections 360, 62, 64 may be formed in a single configuration, including the open-cell stent configuration, mesh-like stent configuration, or Z-stent configuration. The sections 60, 62, 64 may also be formed as a single monolithic component.

[00106] As shown in FIG. 17, the outer surface 314 of the proximal section 360 of the frame 350 is uncovered such that fluid is permitted to pass through the openings 318. The outer surface 316 of the sections 62, 64 are covered with low profile polyester, ePTFE, or other nonporous covering material 84 such that fluid is prevented from passing through the surface 320. The outer surface 320 of the valve component 312 may also be covered with low-profile Dacron or other synthetic material. The uncovered, open cell stent section 360 is configured to allow for coronary artery perfusion. The covered sections 62, 64 serve to stabilize the valve component 312 against the aorta 18 and provide a docking station to ascending aortic extensions or fenestrated/ branch arch grafts. The covered sections 62, 64 would also permit endograft extension of the valve component 312 for suitable type B aneurysms without dilation of the sinutubular junction.

[00107] The delivery of the transcatheter valve component 312 may begin by gaining access to the left ventricle across the native aortic valve. An ascending aortogram may be performed to locate the right and left coronary arteries. An over the wire introducer system, including a guidewire, is used to introduce the valve component 312 into the aorta 18. After the guidewire has been placed into the left ventricle 204 via the iliofemoral, subclavian, or carotid vessels, the valve component 312 may be delivered through the common femoral artery and passed across the native aortic valve 202. After performing an angiogram to delineate the location of the coronary arteries

182, the valve component 312 is released by unsheathing the delivery system, thereby permitting expansion of the self-expanding frame 350, as shown in FIGS. 18-19.

[00108] The balloon-expandable frame 34 may be now deployed by inflating the balloon within the delivery system. This deploys the frame 34 to the predetermined expanded diameter 46 and advances the frame 34 into engagement with the aortic annulus 210, thereby sealing the aortic annulus 210 such that fluid is permitted to pass from the left ventricle 204 only through the valve 32 and the valve 32 is positioned in the aortic annulus 210 proximal to the coronary arteries 182, as shown in FIGS. 18-19. The openings 318 of the uncovered section 360 of the valve component 312 permit blood flow to the coronary arteries 182 for promote circulation. It should be appreciated that the deployment of the valve component 312 may be performed during rapid ventricular pacing (RVP).

[00109] Referring now to FIGS. 20-22, another embodiment of a transcatheter valve component (hereinafter valve component 412) is shown. Some features of the embodiment illustrated in FIGS. 20-22 are substantially similar to those described above in reference to the proximal component 212 of FIGS. 8-16. Such features are designated in FIGS. 20-22 with the same reference numbers as those used in FIGS. 8-16. Similar to the proximal component 212 of FIGS. 8-16, the valve component 412 includes a dual-frame 414 that extends from a proximal end 28 to a distal end 30. The frame 414 is attached to a valve 32 (shown in phantom), which is positioned at the proximal end 28 of the component 412. In the illustrative embodiment, the valve 32 is configured as a bicuspid valve. When the valve component 412 is implanted into the patient's aorta 16, the valve 32 replaces the aortic valve and permits fluid (i.e., blood) to selectively pass from the heart and into a passageway 36 extending through the valve component 412.

[00110] The dual-frame 414 includes a self-expanding outer frame 416 and a balloon-expandable inner frame 218 that is secured to the self-expanding outer frame 416 and houses the valve 32. Referring now to FIG. 9, the self-expanding outer frame 416 has a generally hourglass shape and is formed from a metallic material, such as, nitinol, stainless steel, or other implant grade metallic material. It should be appreciated that in other embodiments the outer frame 416 may be formed from a polymeric material. The outer frame 416 includes an elongated proximal section 220, an inwardly tapered section 422, an outwardly tapered middle section 62, and an elongated distal section 64.

[00111] The elongated proximal section 220 of the outer frame 416 includes the proximal end 28 of the component 412 and has a distal end 224 connected to a proximal end 226 of the inwardly tapered section 222. The proximal section 220 is embodied as a tubular stent. It should be appreciated that in other embodiments the section 220 may be shaped as a prism, cone, or other geometric shape depending on the patient's anatomy.

[00112] In the illustrative embodiment, the proximal section 220 has a length 228 that is equal to approximately 15 mm. The proximal section 220 also has a diameter 230 of approximately 32 mm. It should be appreciated that in other embodiments the dimensions of the frame 416 may vary according to the anatomy of the patient. In the illustrative embodiment, the diameter 230 is oversized relative to the diameter of the aortic annulus 210 such that an interference fit is created between the proximal section 220 and the annulus 210 when the valve component 412 is implanted, as described in greater detail below. As shown in FIG. 9, the proximal section 220 defines a passageway 232 in the outer frame 416.

[00113] In the illustrative embodiment, collagen fibers 234 are attached to the proximal section 220 to aid in preventing paravalvular leaks and migration of the valve component 412

within the aortic walls. The fibers 234 extend outwardly from the proximal section 220 and inwardly into the passageway 232. It should be appreciated that in other embodiments the outer frame 216 may be covered with hydrogel or other sealing materials. In other embodiments, a plurality of barbs or hooks may be attached to the proximal section 220. The hooks may be configured to further engage the tissue of the aorta and inhibit or prevent migration of the device 10.

[00114] The inwardly tapered section 422 of the outer frame 416 includes the proximal end 226 and a distal end 236 connected to the proximal end 68 of the outwardly tapered middle section 62. The section 422 tapers inwardly between the ends 226, 236 from approximately 32 mm at the end 226 to approximately 22 mm at the end 236. In the illustrative embodiment, the inwardly tapered section 422 has a length 238 of approximately 10 mm.

[00115] The outwardly tapered middle section 62 of the self-expanding frame 416 has the proximal end 68 and a distal end 72 connected to the proximal end 74 of the elongated distal section 64. The section 62 tapers outwardly from a diameter of approximately 22 mm at the end 68 to a diameter of approximately 28 mm at the end 72. In the illustrative embodiment, the middle section 62 has a length 76 of approximately 10 mm. In other embodiments, the dimensions of the section 62 may vary depending on, for example, the patient's anatomy.

[00116] The elongated distal section 64 of the self-expanding frame 416 extends distally from the proximal end 74 to the distal end 30 of the component 412. In the illustrative embodiment, the section 64 has a length 78 that is greater than the combined length of the tapered sections 60, 62. In one particular non-limiting example, the length 78 of the elongated distal section 64 is approximately 30 mm and has a diameter 80 of approximately 34 mm. In other embodiments, the dimensions of the section 64 may vary depending on, for example, the patient's anatomy. In one

exemplary embodiment, the distal section 64 may taper between the proximal end 74 and the distal end 30.

[00117] As shown in FIG. 20, each of the proximal section 220 and the inwardly tapered section 422 of the self-expanding frame 416 is formed in an open-cell stent configuration, and each of the sections 62, 64 is formed in a Z-stent configuration. It should be appreciated that in other embodiments the sections 62, 64, 220, 422 may be formed in a single configuration, including the open-cell stent configuration, mesh-like stent configuration, or Z-stent configuration. The sections 62, 64, 220, 422 may also be formed as a single monolithic component. The outer surfaces 440 of the sections 62, 64 are covered with low profile polyester, ePTFE, or other nonporous covering material 442 such that fluid is prevented from passing through the surface 440. The outer surface 444 of the section 422 is uncovered such that fluid is permitted to pass through openings 446 defined in the surface 444. The uncovered, open cell section 422 is configured to allow for coronary artery perfusion. The covered sections 62, 64 serve to stabilize the valve component 412 against the aorta 18 and provide a docking station to ascending aortic extensions or fenestrated/ branch arch grafts.

[00118] As described above, the outer frame 416 of the dual-frame 414 is secured to a balloon-expandable inner frame 218, which is positioned in the passageway 232 and houses the valve 32. As described above, the balloon-expandable frame 218 is expandable during implantation from an unexpanded diameter 450 to the expanded diameter (not shown).

[00119] To deploy the valve component 412, a stiff wire is passed through the aortic valve 202 into the left ventricle 204. The delivery system for the valve component 412 is then passed through the valve 202. When the delivery system is in position, the valve component 412 is released by unsheathing the system, thereby permitting expansion of the self-expanding frame 416.

The proximal section 220 of the frame 416 expands into engagement with the aortic annulus 210, thereby creating an interference fit between the frame 416 and the annulus 210 and stabilizing the valve component 412 in place. As shown in FIG. 21, the inner frame 218 is initially unexpanded within the outer frame 416. The inner frame 218 may be deployed by expanding the balloon assembly. Expansion of the balloon-expandable inner frame 218 engages the inner frame 218 with the outer frame 416 and compresses the collagen fiber/hydrogel coated proximal section 220 of the outer frame 416 against the aortic annulus 210.

[00120] As shown in FIG. 22, the combined engagement of the frames 218, 416 seals the annulus 210 and the paravalvular areas, and thus, prevents paravalvular leakage. As such, fluid is permitted to pass from the left ventricle 204 only through the valve 32 of the component 412. The openings 446 of the uncovered section 422 of the valve component 412 permit blood flow to the coronary arteries 182 for promote circulation.

[00121] It should be appreciated that the design of components 12, 14, 212 and the transcatheter valves 312, 412 has intentionally taken into account the potential failure modes and allows for correction of any such failure modes. For example, with respect to components 12, 14, 212, paravalvular leaks may be corrected. More specifically, with respect to a paravalvular leak (type Ia endoleak), leakage around the valve 32 would act as a type la endoleak. The trapdoors 86 in components 12, 312 would allow for coil embolization of the area of the leak. Two trapdoors at 180 degree location would allow access to the entire area above the aortic annulus. Since the coronary arteries 182 are protected by the conduits 22 in the distal component 14, coil embolization of this area would not compromise the coronary blood flow. Coil embolization of paravalvular leaks are already being performed clinically after heart valve surgery if there are additional leaks around the valve.

[00122] Aortic insufficiency (Al) after implantation may also be corrected. Significant Al has been documented in up to 17% of patients after transcatheter valve implantation. Except heavy annular calcification, the tricuspid morphology of the current valves and the ovoid shape of the aortic annulus can cause malcoaptation of the valve leaflets causing Al. The bicuspid valve nature of the designs discussed herein potentially eliminates the problem with malcoaptation and AI secondary to that.

[00123] Structural valve degeneration may also be corrected. More specifically, the bicuspid valve design allows for placement of another transcatheter valve across the first device without compromising valvular flow area.

[00124] Coronary insufficiency may also be corrected. The Cabrol endo-conduits 22 in conjunction with the tapered section 128 of component 14 ensure uninterrupted coronary blood flow. By first deploying the component 14, the surgeon will be able to work through the Cabrol conduits 22 and using standard catheters and guidewires to cannulate the right and left coronary arteries. Stents 24 are deployed from the coronary arteries into the Cabrol conduits 22. Deployment the component 12 or component 212 may be delayed until coronary blood flow is secured. The tapered design will mitigate the risk of compression of the coronary stents between the device 10 and the aortic wall.

[00125] For the transcatheter valves 312, 412, paravalvular leaks may also be corrected in that the open cell midsections 360, 422 of the valve allow the cannulation and stenting of the coronary arteries with potential coil embolization of the leak after the protection of the coronary artery if necessary.

[00126] Structural valve degeneration in the transcatheter valves 312, 412 may be corrected in that the bicuspid valve design permit for placement of another transcatheter valve across the first device without compromising valvular flow area.

[00127] The dual frame component may also take the form of other transcatheter valvular replacement devices such as, for example, prosthetic mitral and tricuspid valves. The dual frame component may also be used to enhance sealing zones of endovascular devices to treat abdominal and thoracic aneurysms, and in applications to treat peripheral vascular disease.

[00128] It will be appreciated that the devices and methods described herein have broad applications. The foregoing embodiments were chosen and described in order to illustrate principles of the methods and apparatuses as well as some practical applications. The preceding description enables others skilled in the art to utilize methods and apparatuses in various embodiments and with various modifications as are suited to the particular use contemplated. In accordance with the provisions of the patent statutes, the principles and modes of operation of this disclosure have been explained and illustrated in exemplary embodiments.

[00129] It is intended that the scope of the present methods and apparatuses be defined by the following claims. However, it must be understood that this disclosure may be practiced otherwise than is specifically explained and illustrated without departing from its spirit or scope. It should be understood by those skilled in the art that various alternatives to the embodiments described herein may be employed in practicing the claims without departing from the spirit and scope as defined in the following claims.

[00130] The scope of the disclosure should be determined, not with reference to the above description, but should instead be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. It is anticipated and intended that

future developments will occur in the arts discussed herein, and that the disclosed systems and methods will be incorporated into such future examples. Furthermore, all terms used in the claims are intended to be given their broadest reasonable constructions and their ordinary meanings as understood by those skilled in the art unless an explicit indication to the contrary is made herein. In particular, use of the singular articles such as "a," "the," "said," etc. should be read to recite one or more of the indicated elements unless a claim recites an explicit limitation to the contrary. It is intended that the following claims define the scope of the disclosure and that the method and apparatus within the scope of these claims and their equivalents be covered thereby. In sum, it should be understood that the disclosure is capable of modification and variation and is limited only by the following claims.

CLAIMS

1. An endograft device for endovascular repair of ascending aortic aneurysms, comprising:
a first prosthetic component comprising (i) a proximal frame, and (ii) a distal frame secured to the proximal frame and extending to a distal end of the first prosthetic component,
at least one conduit secured to the first prosthetic component and positioned adjacent to the proximal frame,
a second prosthetic component secured to a proximal end of the first prosthetic component, the second prosthetic component comprising (i) a balloon-expandable frame extending distally from a proximal end of the second prosthetic component, and (ii) a self-expanding frame connected to the balloon-expandable frame and extending to a distal end of the second prosthetic component, and
a valve element secured to the balloon-expandable frame at the proximal end of the second prosthetic component.

ABSTRACT OF THE DISCLOSURE

A heart valve assembly includes an inner frame comprising a graft covering housing a prosthetic heart valve, wherein the graft covering extends around the prosthetic heart valve for providing sealing to the heart valve, an outer frame formed from a metallic material and defining a gridded configuration, and being secured to the graft covering by a plurality of stitches, and a sealing material positioned externally to the outer frame for providing sealing between the outer frame and a patient's anatomical wall to prevent paravalvular leaks. The sealing material includes a plurality of radially extending fibers that extend outwardly of the outer frame. The graft covering is made of polyester, polytetrafluoroethylene, expanded polytetrafluoroethylene, or a polymer.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Filer:	Justin Robert Nifong
Attorney Docket Number:	426/2/25 UTIL

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	80	80
UTILITY SEARCH FEE	2111	1	350	350
UTILITY EXAMINATION FEE	2311	1	400	400
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**830**

Electronic Acknowledgement Receipt

EFS ID:	45458833
Application Number:	17719160
International Application Number:	
Confirmation Number:	1031
Title of Invention:	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL
First Named Inventor/Applicant Name:	Ali Shahriari
Customer Number:	175373
Filer:	Justin Robert Nifong
Filer Authorized By:	
Attorney Docket Number:	426/2/25 UTIL
Receipt Date:	12-APR-2022
Filing Date:	
Time Stamp:	18:30:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$830
RAM confirmation Number	E20224BI31282217
Deposit Account	506191
Authorized User	Justin Nifong

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	WebADS.pdf	233080 6d2f6f6e01ac11e1e1fb35c7c65dcbc849ff1751	no	9
Warnings:					
Information:					
2	Oath or Declaration filed	426-2-24UTIL-20121205-Dec-signed.pdf	71450 c3f632215ecdef4e6d637c59526d1ce7f57e4e7a	no	1
Warnings:					
Information:					
3	Power of Attorney	426-2-24UTIL-20210115-POA-signed.pdf	144284 de910837bce2dda58bc88dc91c9a08c087ca1e0f	no	1
Warnings:					
Information:					
4	Drawings-only black and white line drawings	426-2-25UTIL-Drwgs.pdf	2645273 5a4faa1724300fddb2ee0c6c112bc54b05fe3f78	no	19
Warnings:					
Information:					
5		426-2-25UTIL-Spec-claims-abs.pdf	223687 3af2583317090480cb04f1584a183f382a003dda	yes	41

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	39
Claims	40	40
Abstract	41	41

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	44150 4de274dde5f4087b7aa9bb6a440048bada6d8762	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	3361924	

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New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

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

Secrecy Order 37 CFR 5.2:

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

Inventor Information:

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Legal Name

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

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

Correspondence Information:

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

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

Customer Number	175373		
Email Address	docket@nkpatentlaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL		
Attorney Docket Number	426/2/25 UTIL	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	19	Suggested Figure for Publication (if any)	20

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Filing By Reference:

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	175373		

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	
					Remove
Registration Number					
Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	
					Remove
Registration Number					

Additional Representative Information blocks may be generated within this form by selecting the **Add** button.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Domestic Benefit/National Stage Information:

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

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	17327673	2021-05-22

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
17327673	Continuation of	17213251	2021-03-26

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17213251	Continuation of	17096253	2020-11-12	10966846	2021-04-06

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17096253	Continuation of	17060557	2020-10-01	10888441	2021-01-12

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17060557	Continuation of	16910189	2020-06-24	10857011	2020-12-08

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16910189	Continuation of	16808137	2020-03-03	10792172	2020-10-06

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16808137	Continuation of	16736879	2020-01-08	10842655	2020-11-24

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
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Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16736879	Continuation of	16042286	2018-07-23	10555823	2020-02-11

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16042286	Continuation of	14614628	2015-02-05	10028848	2018-07-24

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14614628	Continuation of	14569306	2014-12-12	9339399	2016-05-17

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14569306	Division of	13706896	2012-12-06	8940040	2015-01-27

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13706896	Claims benefit of provisional	61723446	2012-11-07

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13706896	Claims benefit of provisional	61567458	2011-12-06

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

Foreign Priority Information:

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

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

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

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

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	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Applicant Information:

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

Applicant 1

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

Clear

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

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

Name of the Deceased or Legally Incapacitated Inventor:	

If the Applicant is an Organization check here. ☒

Organization Name	Aortic Innovations, LLC

Mailing Address Information For Applicant:

Address 1	977 Hillsboro Mile		
Address 2			
City	Hillsboro Beach	**State/Province**	FL
Country[i]	US	Postal Code	33062
Phone Number		Fax Number	
Email Address			

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Assignee Information including Non-Applicant Assignee Information:

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

Assignee 1

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

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

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	426/2/25 UTIL
	Application Number	
Title of Invention	TRANSCATHETER VALVE REPAIR HAVING IMPROVED PARAVALVULAR SEAL	

Signature:

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

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

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

Signature	/Justin R. Nifong/			Date (YYYY-MM-DD)	
First Name	Justin	Last Name	Nifong	Registration Number	59389

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

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	DEVICE FOR ENDOVASCULAR AORTIC REPAIR AND METHOD OF USING THE SAME

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____ filed on _____.

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Ali SHAHRIARI Date (Optional): 12/5/12

Signature: A. Shah

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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