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 16/933,995	Filing Date 07/20/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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	07/20/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 1	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	Unassigned
First Inventor	:	Robert E. Wright et al.
Title	:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
Filed	:	July 20, 2020
Examiner	:	Unassigned
Customer No.	:	148468

Mail Stop Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Commissioner:

Prior to examination of the above-identified application, which is being filed concurrently herewith, the Applicant respectfully requests entry of the following amendments:

Amendments to the Specification begin on page 2.

Amendments to the Claims are reflected in the Listing of Claims that begins on page 3 of this paper.

Remarks begin on page 4 of this paper.

Amendments to the Specification

Please replace paragraph [0001] of the specification with the following amended paragraph:

[0001] This application is a continuation of U.S. Patent Application No. 15/098,673, filed on April 14, 2016, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, which is a continuation of U.S. Patent Application No. ~~App. No.~~ 12/940,974, filed on November 5, 2010, titled METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY, ~~which is hereby incorporated by reference in its entirety and~~ which claims the benefit of U.S. Provisional Patent Application ~~App.~~ No. 61/280,557, filed on November 5, 2009, titled NOVEL MEDICAL NEEDLE INCORPORATING MULTIPLE FILAMENTS FOR IMPROVED ENERGY DELIVERY and U.S. Provisional Patent ~~App.~~ Application No. 61/347,351, filed on May 21, 2010, titled METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY; the entire contents of each of the foregoing applications ~~both of which~~ are hereby incorporated by reference herein in their entirety.

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 3 of 385

Amendments to the Claims

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

1. (Cancelled)

2. (New) A needle for insertion into a patient during an RF ablation procedure, the needle comprising:

a hub;

an elongate member fixed to the hub;

a tip fixed to the elongate member at a distal end of the needle;

a plurality of filaments disposed within at least a portion of the elongate member in a retracted position, wherein the plurality of filaments consists of a first filament and a second filament, wherein the needle contains no filaments other than the first and second filaments; and

an actuator interconnected to the plurality of filaments, wherein the actuator is operable to move the plurality of filaments relative to the hub, elongate member and tip between the retracted position and a deployed position, wherein in the deployed position the plurality of filaments extend outwardly and away from the tip, wherein each filament comprises a distal end that defines a point in the deployed position, wherein each point is disposed distal to the distal end of the needle, wherein in their respective deployed positions each distal end defines a vertex of a polygon, and wherein a centroid of the polygon is offset from a central longitudinal axis of the needle.

Petitioner's Exhibit 1008
Avanos v. Stratus
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Remarks

By this paper, amendments to paragraph [0001] of the specification are presented, claim 1 is cancelled without prejudice or disclaimer, and new claim 2 is added. Upon entry of this paper, claim 2 will be pending in the Application.

The Applicant respectfully requests examination of the Application as amended herein. The Examiner is invited to contact the undersigned attorney should there be any impediment to the prompt allowance of this Application that is susceptible to being addressed by a telephonic interview or overcome by an examiner's amendment.

DATED this 20th day of July, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Registration No. 55,265
Attorney for Applicant

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, Utah 84116
(801) 703-1961

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 5 of 385

PTO/AIA/01 (06-12)
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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	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY

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 15/098,673

filed on April 14, 2016

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: Robert E. Wright Date (Optional): _____

Signature: _____

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.

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.

PTO/AIA/01 (06-12)
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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 15/098,673

filed on April 14, 2016.

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.

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LEGAL NAME OF INVENTOR

Inventor: Scott A. Brandt Date (Optional): 2/16/20

Signature: _____

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.

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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:	
Filing Date:	
Title of Invention:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Filer:	Daniel Christopher Higgs
Attorney Docket Number:	NBUS.001C1C1

Filed as Small Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70

Petition:	
Patent-Appeals-and-Interference:	
Post-Allowance-and-Post-Issuance:	
Extension-of-Time:	
Miscellaneous:	
Total in USD ($)	**2855**

Electronic Acknowledgement Receipt

EFS ID:	40055258
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	20-JUL-2020
Filing Date:	
Time Stamp:	23:42:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2855
RAM confirmation Number	E20207JN42438360
Deposit Account	602176
Authorized User	Daniel Higgs

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

37 CFR 1.21 (Miscellaneous fees and charges)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	NBUS001C1C1_Track1Req.pdf	113903 1fadaa854bb4c9e603b77610625547fed6049a9c	no	2
Warnings:					
Information:					
2	Application Data Sheet	NBUS001C1C1_ADS.pdf	1256646 c3a3d6e0b1895ed4d20ccd9b4045c04192d8f7b1	no	9
Warnings:					
Information:					
3		NBUS001C1C1_Specification_ASFILED.pdf	199282 90b3bd499c3c70643cb15edfe82bbf16ecfdc475	yes	48

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	46
Claims	47	47
Abstract	48	48

Warnings:					
Information:					
4	Drawings-only black and white line drawings	NBUS001C1C1_Drawings_ASFILED.PDF	189731 de0407f49ac8927711876c7cf67f4afd06585d5be	no	19
Warnings:					
Information:					
5		NBUS001C1C1_Preliminary_Amendment.pdf	102733 00383f9934533ef44e70016d8649b4e51f455d55	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Specification	2	2
	Claims	3	3
	Applicant Arguments/Remarks Made in an Amendment	4	4

Warnings:					
Information:					
6	Oath or Declaration filed	15_098673_Declaration_Wright.pdf	486240 f61615f3151482a75d3382ddd51d43183c9fd32d	no	2
Warnings:					
Information:					
7	Oath or Declaration filed	15_098673_Declaration_Brandt.pdf	518382 486ca7ccec20903833f47b565f1c868535299f80	no	2
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	40166 152dc8f463b673e0614dffc4aee2d260cb3e2a77	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2907083		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Robert E. Wright	Nonprovisional Application Number (if known):	
Title of Invention:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Daniel C. Higgs/	Date 2020-07-20
Name (Print/Typed) Daniel C. Higgs	Practitioner Registration Number 55265

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☐ *Total of _____ forms are submitted.

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

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

Secrecy Order 37 CFR 5.2:

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robert	E.	Wright	

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

City	Country of Residence	
Clayton	AU	

Mailing Address of Inventor:

Address 1	Metro Pain Group Pty Ltd
Address 2	Monash House, Ground Floor, 271 Clayton Road
City	Clayton **State/Province**
Postal Code	3168 **Country** AU

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Scott	A.	Brandt	

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

City	State/Province	Country of Residence	
Denver	CO	US	

Mailing Address of Inventor:

Address 1	333 S. Monroe St. Unit 113
Address 2	
City	Denver **State/Province** CO
Postal Code	80209 **Country** US

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

Correspondence Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

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	148468		
Email Address	dhiggs@biomerics.com	Add Email	Remove Email
Email Address	dhiggs@medventureholdings.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY		
Attorney Docket Number	NBUS.001C1C1	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	19	**Suggested Figure for Publication (if any)**	11A

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)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

Customer Number	148468

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	15098673	2016-04-14
Prior Application Status	Abandoned		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15098673	Continuation of	12940974	2010-11-05
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12940974	Claims benefit of provisional	61347351	2010-05-21
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12940974	Claims benefit of provisional	61280557	2009-11-05

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

Foreign Priority Information:

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

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

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

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	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

Applicant Information:

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

Applicant 1 — Remove

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

Clear

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

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

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Stratus Medical, LLC		
Mailing Address Information For Applicant:			
Address 1	6030 W. Harold Gatty Dr.		
Address 2			
City	Salt Lake City	**State/Province**	UT
Country	US	Postal Code	84116
Phone Number		Fax Number	
Email Address	dhiggs@medventureholdings.com		

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

Assignee Information including Non-Applicant Assignee Information:

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

Assignee 1

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

Remove

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

Organization Name	Stratus Medical, LLC

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	6030 W. Harold Gatty Dr.		
Address 2			
City	Salt Lake City	**State/Province**	UT
Country i	US	Postal Code	84116
Phone Number		Fax Number	
Email Address	dhiggs@medventureholdings.com		

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

Signature:

Remove

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

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

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

Signature	/Daniel C. Higgs/			Date (YYYY-MM-DD)	2020-07-20
First Name	Daniel	Last Name	Higgs	Registration Number	55265

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NBUS.001C1C1
	Application Number	
Title of Invention	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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

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

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

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

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

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

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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.

METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY

RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent App. No. 12/940,974, filed on November 5, 2010, which is hereby incorporated by reference in its entirety and which claims the benefit of U.S. Provisional Patent App. No. 61/280,557, filed on November 5, 2009, and U.S. Provisional Patent App. No. 61/347,351, filed on May 21, 2010, both of which are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to thermal ablation systems and methods and, more specifically, to improved systems and methods for performing Radio Frequency (RF) neurotomy. The invention is particularly apt for spinal RF neurotomy procedures.

BACKGROUND OF THE INVENTION

[0003] Thermal ablation involves the creation of temperature changes sufficient to produce necrosis in a specific volume of tissue within a patient. The target volume may be, for example, a nerve or tumor. A significant challenge in ablation therapy is to provide adequate treatment to the targeted tissue while sparing the surrounding structures from injury.

[0004] RF ablation uses electrical energy transmitted into a target volume through an electrode to generate heat in the area of the electrode tip. The radio waves emanate from a non-insulated distal portion of the electrode tip. The introduced radiofrequency energy causes molecular strain, or ionic agitation, in the area surrounding the electrode as the current flows from the electrode tip to ground. The resulting strain causes the temperature in the area surrounding the electrode tip to rise. Temperature calibration or measurement devices, for example thermocouples, in the electrode may provide feedback and allow precise control of the temperatures produced at the electrode tip.

[0005] RF neurotomy uses RF energy to cauterize a target nerve to disrupt the ability of the nerve to transmit pain signals to the brain. Known RF neurotomy methods typically use a single RF probe generating a generally oval or oblate spheroid lesion. The RF

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probe is positioned in an attempt to include the target nerve within the oval or oblate spheroid lesion. In various procedures, access to a target nerve may be limited (e.g., limited to a restricted angular range), thereby raising significant challenges to medical personnel to create sufficient lesions to provide optimal clinical outcomes. Additionally, anatomical variations of the nerve location relative to anatomical landmarks provide additional challenges.

SUMMARY OF THE INVENTION

[0006] The present invention is directed toward improved methods, systems, and related apparatuses for performing thermal ablation in general, and in particular, improved methods, systems, and related apparatuses for performing RF neurotomy, specifically in the region of the spine of a patient.

[0007] In one aspect, a needle is provided for use (e.g., insertion into a patient) during an RF ablation procedure that comprises a hub, an elongate member fixed to the hub, a tip fixed to the elongate member at a distal end thereof, and a plurality of filaments disposed within at least a portion of the elongate member. The needle may further include an actuator interconnected to the plurality of filaments, wherein the actuator may move relative to the hub so as to move the plurality of filaments relative to the tip of the needle.

[0008] In one approach, the tip and first and second ones of the plurality of filaments are operable as a single monopolar RF electrode. By way of example, in one implementation the needle may include a lumen disposed within the elongate member, wherein the lumen and tip are configured to receive an RF probe, wherein the tip and the first and second filaments may be electrically connected to the RF probe for delivery of an RF energy signal. In another implementation, an RF probe may be integrated into the needle structure for communication of an RF signal to the tip and plurality of filaments.

[0009] In another approach, the tip and the plurality of filaments may be operable in a bipolar manner. For example, the tip and/or one or more of the plurality of filaments may be electrically interconnected to an RF energy source to combinatively operate as an active RF electrode. In turn, one or a plurality of additional ones of the plurality of filaments may be electrically interconnected to combinatively function as a return RF electrode.

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[0010] In a further aspect, the actuator may be operable to move the plurality of filaments relative to the tip between a retracted position and a deployed position, wherein in the deployed position the plurality of filaments extend outwardly from the tip. In this regard, each filament may comprise a distal end, wherein in a deployed position the distal ends of the filaments each define a point, and wherein the average of all the points is offset from a central longitudinal axis of the elongate member.

[0011] In one embodiment, the average of distal end points of first and second filaments may be at midpoint between such distal ends. In certain embodiments, the distal end of each of the plurality of filaments defines a vertex of a polygon, wherein an average of corresponding points is a centroid of the polygon.

[0012] In certain embodiments, a first filament and a second filament may have corresponding distal ends which, together with a distal end of the tip, define a polygon therebetween. In this regard, in various implementations the plurality of filaments may be disposed asymmetrically about a central longitudinal axis of the elongate member in their deployed position.

[0013] In another aspect, a method for performing RF neurotomy in a patient is provided (e.g., spinal RF neurotomy), and includes the steps of moving a tip of a needle to a first position proximate to a target nerve along the spine of a patient, and after achieving the first position, advancing a plurality of filaments relative to the tip to a deployed position. After such positioning, the method may include the step of applying RF energy to the tip and/or at least one of the plurality of filaments, wherein said RF energy application generates heat to ablate at least a portion of the target nerve.

[0014] In one approach, the RF energy may be applied to the needle tip and each of the plurality of filaments to yield monopolar operation. In another approach, the RF energy may be applied to the tip and/or one or more of the plurality of filaments to define an active electrode, while one or more additional one of the plurality of filaments are electrically isolated to function as a return electrode for bipolar operation.

[0015] In relation to the present invention it is recognized that, as RF energy penetrates biological tissue, protein and water molecules oscillate in response to the RF current and the tissue adjacent to the active needle tip heats secondary to ionic friction. As the

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tissue heats, and coagulates, the biophysical properties of the tissue change. These tissue changes limit penetration of the RF energy beyond a leading edge defined by the shape and size of the active needle tip. The size of a radiofrequency lesion using conventional needle technology is limited regardless of the duration of lesion or maximum temperature delivered.

[0016] The described invention overcomes this obstacle and expands the effective area of RF energy delivery by increasing the overall active tip surface area from which the RF energy emanates. The use of multiple filaments provides additional conduits for RF energy creating a multipolar RF field effect. The size and specific conformation of the RF lesion may be dictated by the location and orientation of the filaments, and may be beneficially modified to suit a specific anatomical application by changing the size, placement, and number of filaments.

[0017] Additional aspects and advantages of the present invention will become apparent to one skilled in the art upon consideration of the further description that follows. It should be understood that the detailed description and specific examples are intended for purposes of illustration only and are not intended to limit the scope of the invention. Furthermore, any of the above arrangements, features and/or embodiments may be combined with any of the above aspects where appropriate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] For a more complete understanding of the present invention and further advantages thereof, reference is now made to the following Detailed Description of the Invention taken in conjunction with the accompanying drawings, wherein:

[0019] FIG. 1 is a schematic diagram of an RF neurotomy system being used to perform RF neurotomy on a patient.

[0020] FIG. 2A is a perspective view of a needle that may be used in an RF neurotomy procedure.

[0021] FIG. 2B is a cut away perspective view of a portion of the needle of FIG. 2A.

[0022] FIG. 2C is a cut away view of a portion of an alternate embodiment of a needle that may be used in an RF neurotomy procedure.

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[0023] FIG. 3A is a detailed view of a tip of the needle of FIG. 2A with filaments disposed in a fully deployed position.

[0024] FIG. 3B is a detailed view of a tip of the needle of FIG. 2A with filaments disposed in a retracted position.

[0025] FIG. 3C is a detailed view of an alternate tip of the needle of FIG. 2A with filaments disposed in a deployed position.

[0026] FIG. 4 is a schematic diagram of an RF probe assembly.

[0027] FIG. 5 is an end view of the needle of FIG. 2A.

[0028] FIG. 6 is a side view of the tip of the needle of FIG. 2A.

[0029] FIG. 7 is an end view of another alternate embodiment of the needle of FIG. 2A.

[0030] FIG. 8 is an end view of another alternate embodiment of the needle of FIG. 2A.

[0031] FIG. 9 is an end view of another alternate embodiment of the needle of FIG. 2A.

[0032] FIG. 10 is a side view of another alternate embodiment of the needle of FIG. 2A.

[0033] FIG. 11A is an illustration of an exemplary set of isotherms that may be created with the needle of FIG. 2A.

[0034] FIG. 11B is an illustration of an exemplary lesion that may be created with the needle of FIG. 2A.

[0035] FIG. 11C is an illustration of an exemplary lesion that may be created with a single-filament needle.

[0036] FIG. 12 is a perspective view of the needle of FIG. 2A positioned relative to a lumbar vertebra for performing RF neurotomy.

[0037] FIG. 13 is an illustration of a sacrum including target lesion volumes for performing Sacroiliac Joint (SIJ) RF neurotomy.

[0038] FIG. 14 is a perspective view of the needle of FIG. 2A positioned relative to a thoracic vertebra for performing RF neurotomy.

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[0039] FIG. 15 is a perspective view of the needle of FIG. 2A positioned relative to the C2/3 cervical zygapophyseal joint (z joint)for performing cervical medial branch RF neurotomy on the third occipital nerve.

DETAILED DESCRIPTION OF THE INVENTION

[0040] In the following description, the invention is set forth in the context of apparatus and methods for performing RF ablation. More particularly, the systems and methods may be used to perform RF neurotomy to ablate portions of target nerves. Even more particularly, the systems and methods may be used to perform spinal RF neurotomy to ablate portions of target nerves along the spine of a patient to relieve pain. For example, embodiments of methods and apparatuses described herein relate to lumbar RF neurotomy to denervate a facet joint between the L4 and L5 lumbar vertebrae. Denervation is achieved by application of RF energy to a portion of a medial branch nerve to ablate or cauterize a portion of the nerve, thus interrupting the ability of the nerve to transmit signals to the central nervous system. In another example, embodiments described herein relate to sacroiliac joint RF neurotomy.

[0041] FIG. 1 is an illustration of an RF neurotomy system 100 for performing RF neurotomy on a patient 101. The patient 101 may be positioned face down on a table 109 or surface to allow access along the spine of the patient 101. The table 109 may be made of radiolucent materials substantially transparent to x-rays, such as carbon fiber.

[0042] The system 100 may include an RF generator 102 capable of generating an RF energy signal sufficient to ablate target tissue (e.g. cause lesions in targeted volumes; cauterize targeted portions of target nerves). The RF generator 102 may, for example, be capable of delivering RF energy of about 460,000-500,000 Hz. A needle 103 capable of conducting (e.g., transmitting or directing) RF energy may be interconnected to the RF generator 102 and may be used to deliver an RF energy signal to a specific site within the patient 101. Where the needle 103 is a monopolar device, a return electrode pad 104 may be attached to the patient 101 to complete a circuit from the RF generator 102, through the needle 103, through a portion of the patient 101, and back to the RF generator 102 through

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the return electrode pad 104. In other bipolar arrangements the needle 103 may comprise at least one supply electrode and at least one return electrode to define the circuit.

[0043] The RF generator 102 may be operable to control the RF energy emanating from the needle 103 in a closed-loop fashion. For example, the needle 103 and/or an RF probe disposed within the needle 103 may contain a temperature measurement device, such as a thermocouple, to measure the temperature at the target tissue. Data may also be available from the RF generator 102, such as power level and/or impedance, which may also be used for closed-loop control of the needle 103.

[0044] Turning to FIG. 4, an exemplary RF probe assembly 400 compatible with the needle 103 is illustrated. The RF probe assembly 400 includes an RF probe 401 that may be inserted into a patient (e.g., through needle 103) and may direct RF energy to the target tissue. The RF probe 401 may include a thermocouple operable to measure temperature at a distal end 402 of the RF probe 401. The RF probe assembly 400 may include a connector 403 and a cable 404 for use in connecting the RF probe 401 to the RF generator 102.

[0045] Returning to FIG. 1, the system 100 may include an imaging system 105 capable of producing internal images of the patient 101 and the needle 103 to facilitate navigation of the needle 103 during a procedure. The system 100 may further include a display for displaying the generated images to a physician performing the RF ablation procedure. In one example, the imaging system 105 may be a fluoroscope capable of generating real-time two dimensional images of the needle 103 and internal structures of the patient 101. As such, the imaging system may include an X-ray source 106, an X-ray detector 107 and a controller 108. The X-ray source 106 and X-ray detector 107 may be mounted on a movable structure (e.g., a C-arm), to facilitate capturing a variety of images of the patient 101 (e.g., at various angles or projection views). Alternatively, the imaging system 105 may be any other appropriate imaging system, such as, for example, a computed tomography (CT) scanner.

[0046] FIG. 2A is a detailed view of the needle 103 of the system 100 for performing RF neurotomy. The needle 103 may include a tip 201 that tapers to a point 301 capable of piercing the skin of a patient. The needle 103 may further include an elongate member 203 connected to the tip 201 at a distal end 202 of the needle 103 and connected to a

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hub 204 at a proximal end 205 of the needle 103. The needle 103 includes a central longitudinal axis 223 that is disposed along the center of the elongate member 203.

[0047] The needle 103 may include a self-contained mechanical mechanism, in the form of deployable filaments 206a, 206b, operable to expand the volume of effective RF energy delivery as compared to known single-electrode RF probes. The filaments 206a, 206b may be at least partially disposed within the elongate member 203 and may be operable to emerge through a side wall of the needle 103 proximate to the distal end 202 of the needle 103. Alternatively, the needle 103 may include a single filament or three or more filaments. The filaments 206a, 206b allow offsetting and/or contouring of the lesion geometry produced using the needle 103 to match a desired target volume. The filaments 206a, 206b may be deployable and/or retractable by moving an actuator 216 relative to the hub 204.

[0048] As will be further described, the needle 103 may further include a tube 207 that includes a lumen therethrough. The lumen may be used to transport fluids to and/or from the target volume. The lumen may also accept the RF probe 401 for delivery of RF energy to the target volume. In an alternate embodiment, the RF probe 401 may be integrated into the needle 103. In such an embodiment, the tube 207 need not be present for RF energy delivery, although it may be included to facilitate fluid delivery. The filaments 206a, 206b may include lumens therethrough for the transportation of fluid to and/or from the target volume. The filaments 206a, 206b may function as thermocouples.

[0049] As RF energy penetrates biological tissue, protein and water molecules oscillate in response to the RF current and the tissue adjacent to the RF electrode is heated. As the tissue heats and coagulates, the biophysical properties of the tissue change. These tissue changes limit penetration of the RF energy beyond a leading edge defined by the shape and size of an active needle tip. Accordingly, the size of a radiofrequency lesion using conventional single needle technology is thus practically limited after achievement of a certain temperature delivered for a certain time.

[0050] The needle 103 with deployable filaments 206a, 206b overcomes this obstacle and expands the effective area of RF energy delivery by providing multiple locations (e.g., tip 201 and filaments 206a, 206b) from which the RF energy emanates. The use of multiple filaments 206a, 206b provides additional conduits for RF energy creating a multiple

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electrode RF field effect. The size, shape and location of a lesion created with the needle 103 may be established by the quantity, location and orientation of the filaments, and may be beneficially modified to suit a specific anatomical application by changing various aspects of the filaments as discussed below.

[0051] Where it is desired to create a lesion offset from the central longitudinal axis 223, the lesion may be preferentially offset in a desired direction from the central longitudinal axis 223 by rotationally orienting the needle 103. Moreover, the needle 103 may be used to create a lesion offset from the central longitudinal axis 223 in a first direction. Then, the filaments 206a, 206b may be retracted, the needle 103 rotated, and the filaments 206a, 206b re-deployed to create a lesion offset from the central longitudinal axis 223 in a second direction.

[0052] FIGS. 3A and 3B are detailed views of the distal end 202 of the needle 103 that includes the tip 201. The tip 201 may include the sharpened point 301 for piercing the skin of a patient and facilitating advancement through tissue. The tip 201 may further include a tapered portion 302 that transitions the tip 201 from the point 301 to a body portion 303. The body portion 303 is the portion of the tip 201 that is disposed proximal to the tapered portion 302. The body portion 303 may be cylindrical as illustrated, or it may be of any other appropriate shape. The body portion 303 may have a cross-section that coincides with the cross section of the elongate member 203.

[0053] The tip 201 may act as an RF energy delivery element. As such, the tip 201 may be made from a conductive material such as, for example, stainless steel. The tip 201 may be coated. The tip 201 material and optional coating may be selected to improve radiopacity, improve and/or alter RF energy conduction, improve lubricity and/or reduce tissue adhesion.

[0054] The tip 201 may include filament port or slot 304a (not visible in the views of FIGS. 3A and 3B) and filament port or slot 304b. The geometry of the filament slots 304a, 304b may be selected to allow filaments 206a, 206b to be adequately retracted (e.g., such that they are disposed within a cross-sectional envelope of the body portion 303 of the tip 201) while the needle 103 is inserted into the body, so that the filaments 206a, 206b do not cause any unintended damage to the patient. Such positioning of the filament slots 304a,

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304b avoids having filament exit features on the tapered portion 302 and thus avoids potential coring that could be caused by such positioning.

[0055] The internal geometry of the filament slots 304a, 304b may be designed such that the filaments 206a, 206b may be easily retracted and advanced. For example, the internal geometry of the filament slots 304a, 304b may include a transition region 305 that meets the outer surface of the body portion 303 at an angle of about 30 degrees. The transition region 305 may, for example, be curved or planar. Thus, when the filaments 206a, 206b are in the form of a member without a pre-set bias (e.g., substantially straight), advancement of the filaments 206a, 206b relative to the filament slots 304a, 304b, will cause the filaments 206a, 206b to be deflected outwardly as the filaments 206a, 206b move distally along the transition region 305. Depending on the positioning of the transition region 305 relative to where the filaments 206a, 206b are confined (e.g., in the needle 103 of FIG. 3A the filaments 206a, 206b are confined to only longitudinal movement where they enter into the elongate member 203) and on the mechanical properties of the filaments 206a, 206b, various deployment angles of the filaments 206a, 206b relative to the central longitudinal axis 223 may be achieved. Generally, the portions of the filaments 206a, 206b that extend outwardly away from the filament slots 304a, 304b may be unrestrained and thus may take any appropriate form. For example, where there is no pre-set bias, the portions of the filaments that extend outwardly away from the filament slots (and therefore from the tip) may be substantially straight, such as shown in FIGS. 2A, 3A, 3C, 6, 11A-11C and 14. Where a pre-set bias is present, the portions of the filaments that extend outwardly away from the filament slots may take any appropriate shape, such as, for example, curved as shown in FIG. 10.

[0056] The radial orientation of the filament slots 304a, 304b may be selected such that a center point between the filament slots 304a, 304b does not coincide with the central longitudinal axis 223. For example, as shown in FIGS. 2A, 3A and 3B, the filament slots 304a, 304b may be positioned such that they are about 120 degrees apart about the circumference of the tip 201. Other filament slot configurations may be configured to achieve the filament placements discussed below. These configurations may be achieved by varying the quantity of filament slots, the placement of filament slots about the circumference of the

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tip 201, and/or the placement of filament slots along the center longitudinal axis 223 to achieve the filament placements discussed below.

[0057] As noted above, and illustrated in FIGS. 3A and 3B, the needle 103 may comprise a tube 207 that includes a lumen 222 therethrough. The lumen 222 may be employed to accept the RF probe 40 for delivery of RF energy and/or for the transport of fluids. In this regard, the tip 201 may further include a fluid port 210 that may be in fluid communication via a channel through the tip 201 with the lumen 222. The fluid port 210 may be centrally located or it may be located offset from the center longitudinal axis 223 as shown in FIGS. 2A and 3A. The fluid port 210 may be used to transfer fluid between the region of the tip 201 and the proximal end 205 of the needle 103. For example, during an RF neurotomy procedure, an anesthetic and/or an image enhancing dye may be introduced into the region of tissue around the tip 201 through the fluid port 210. In an alternate embodiment, the fluid port 210 may be located along the body portion 303 of the tip 201.

[0058] As may be appreciated, the channel through the tip 201 may be sized to accommodate a tip of the RF probe 401 that may be inserted into the needle 103. The channel may be sized such that RF energy from the inserted RF probe 401 is satisfactorily passed from the RF probe 401 to the tip 201 and filaments 206a, 206b.

[0059] The elongate member 203 may be in the form of a hollow tube (e.g., sheath, cannula) interconnecting the tip 201 with the hub 204. The elongate member 203 may be configured with adequate strength to allow the needle 103 to pierce the patient's skin and advance to a target area through various tissue types, including, for example, fat and muscle tissue. The elongate member 203 may also be capable of resisting kinking as it is advanced. In an alternate embodiment, the elongate member 203 may be a rod with a plurality of lumens along its length to accommodate filaments 206a, 206b, the RF probe 401, and/or a fluid passage.

[0060] The elongate member 203 houses portions of the filaments 206a, 206b and the tube 207, and allows for relative movement of the filaments 206a, 206b. The elongate member 203 may be of any appropriate size and internal configuration to allow insertion into the patient 101 and to house componentry therein. In an exemplary embodiment, the elongate member 203 may, for example, be a 16 gauge round tube or smaller. For example, the

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elongate member 203 may be 18 or 20 gauge. For example, the elongate member may have a maximum cross dimension of at most about 1.7 mm. In another example, the elongate member may have a maximum cross dimension of at most about 1 mm. The elongate member 203 may have a length selected for performing a specific spinal RF neurotomy procedure on a particular patient. The elongate member 203 may be constructed from an insulative material to reduce the amount of RF energy emitted along the length of the elongate member 203 when the RF probe 401 is disposed therein. For example, the elongate member 203 may be constructed from polymeric, ceramic or other insulative material. The elongate member 203 may include a coating that may improve radiopacity to aid in visualization of the position of the needle 103 using fluoroscopy. The elongate member 203 may include a coating to improve its insulative properties. The elongate member 203 may include a lubricious coating to improve its ability to be inserted and positioned within the patient and to reduce tissue adhesion. The elongate member 203 may include markers 224 along its length to assist in determining the depth to which the needle 103 has entered into the anatomy. Such markers 224 may be radiopaque so that they may be viewed under fluoroscopy. A collar (not shown) may be disposed about the elongate member 203 to assist in placement of the tip 201 of the needle 103. For example, the tip 201 may be positioned in a first position, the collar may then be placed against the patient's 101 skin, and then the needle 103 may be withdrawn a certain distance. Such a distance will be indicated by the distance between the collar and the patient's 101 skin.

[0061] The elongate member 203 may be fixedly interconnected to the tip 201 and hub 204 in any appropriate manner. For example, the tip 201 may be press fit into the elongate member 203 and the elongate member 203 may be press fit into the hub 204. Other possible methods of attachment include adhesive bonding and welding. In an alternate embodiment, the elongate member 203 and the tip 201 may be a single unitary structure. The elongate member 203 may be steerable and incorporate controlling mechanisms allowing the elongate member 203 to be deflected or steered after insertion into the anatomy.

[0062] The tube 207 containing the lumen 222 may be constructed from any appropriate material. For example, the tube 207 may be constructed from a conductive material, such as stainless steel, such that when the RF probe 401 is inserted within the tube

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207, the RF energy emitted by the RF probe 401 may be conducted through the tube 207 and into and through the tip 201 and filaments 206A, 206b. The tube 207 may be interconnected to the tip 201 such that the lumen 222 is in sealed, fluid communication with the channel through the tip 201. This may be accomplished by a press fit, weld, or any other appropriate method.

[0063] As noted, the lumen 222 may be in fluid communication with the tip 201 at the distal end 202. A proximal end of the lumen 222 may be disposed at the proximal end 205 of the needle 103. In this regard, the lumen 222 may run from the distal end 202 to the proximal end 205 with the only access being at the distal and proximal ends. Furthermore, the lumen 222 may be the only lumen of the needle 103 disposed along the elongate member 103.

[0064] Accordingly, the RF probe 401 inserted into the lumen 222 may be positioned such that an end of the RF probe 401 is proximate the tip 201. For example, the RF probe 401 may be positioned such that the distal end 402 of the RF probe 401 is in the lumen 222 near the tip 201 or in the channel through the tip 201. Thus, RF energy transmitted through the RF probe 401 may be conducted by the tip 201 and filaments 206a, 206b. The size of the lumen 222 may be selected to accommodate a particular size of RF probe 401. For example, for a 22 gauge RF probe 401, at least a 21 gauge or larger lumen 222 may be employed. For example, the lumen 222 may have a maximum cross-dimension of less than about 0.85 mm.

[0065] The proximal end of the tube 207 may be operable to receive the RF probe 401. Moreover, the proximal end of the tube 207 and the actuator 216 may be configured to accept a connector, such as a Luer fitting, such that a fluid source may be connected to the tube 207.

[0066] As illustrated in FIGS. 2A and 3A, the needle 103 includes two filaments 206a, 206b disposed within and along elongate member 203. Distal ends of the filaments 206a, 206b are disposed proximate to the tip 201 and proximal ends of the filaments 206a, 206b are fixed to a filament hub 221 discussed below. The filaments 206a, 206b are movable along the central longitudinal axis 223 between a fully deployed position as illustrated in FIGS. 2A and 3A and a retracted position illustrated in FIG. 3B. Moving the filaments 206a,

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206b distally from the retracted position moves the filaments 206a, 206b toward the fully deployed position, while moving the filaments 206a, 206b proximally from the deployed position moves the filaments 206a, 206b toward the retracted position. The filaments 206a, 206b may be deployed in intermediate positions between the fully deployed positions and the retracted positions.

[0067] In the fully deployed position as shown in FIG. 3A, the distal ends of the filaments 206a, 206b are disposed away from the tip 201. In the refracted position as shown in FIG. 3B, the distal ends of the filaments 206a, 206b are disposed entirely within an outer perimeter (e.g., circumference where the non-tapered portion 303 of the tip 201 is round) of the tip 201. In the deployed position, the filaments 206a, 206b act as broadcast antennae for the RF probe 401 (e.g., RF energy passes from the RF probe 401 to tip 201 and filaments 206a, 206b, and into a target volume within the patient 101). In this regard, together, the RF probe 401 inserted into the lumen 222, the tip 201, and the filaments 206a, 206b, may form a monopolar electrode for application of RF energy to the target volume. The filaments 206a, 206b allow the RF energy from the RF probe 401 to be dispersed over a larger volume than would be possible with the tip 201 alone.

[0068] The filaments 206a, 206b may be constructed from a material operable to conduct RF energy, e.g., a metal such as stainless steel, Nitinol or shape memory alloy. The filaments 206a, 206b may be coated to enhance their ability to conduct RF energy. The filaments 206a, 206b may include a lubricious coating to aid in insertion and/or reduce tissue adhesion. The distal ends of the filaments 206a, 206b may be shaped (e.g., pointed) to improve their ability to move through tissue.

[0069] The positioning of the filaments 206a, 206b of the embodiment illustrated in FIGS. 2A and 3A will now be described in relation to FIG. 5. FIG. 5 is an end view of the tip 201 and deployed filaments 206a, 206b of the embodiment illustrated in FIGS. 2A and 3A. The filaments 206a, 206b are positioned at a filament angle 503 of about 120 degrees apart from each other about the central longitudinal axis 223. This coincides with the positions of the filament slots 304a, 304b discussed above since the filaments 206a, 206b emerge from the filament slots 304a, 304b. Accordingly, a filament-free angle 504 of about 240 degrees is defined as the largest angle about the circumference of the tip 201 that is free

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of filaments 206a, 206b. In an embodiment consisting of two filaments, the filament angle 503 may be less than 180 degrees and the filament-free angle 504 may be correspondingly greater than 180 degrees (e.g., greater than 200 degrees or greater than 240 degrees).

[0070] In FIG. 5, the central longitudinal axis 223 is perpendicular to the plane of the illustration. A midpoint 502 is defined between distal ends 501a, 501b of the filaments 206a, 206b, respectively. The midpoint 502 is offset from the central longitudinal axis 223. For example, in an embodiment, the midpoint 502 may be offset from the central longitudinal axis 223 by about 2 mm. Accordingly, when RF energy is transmitted from the tip 201 and filaments 206a, 206b, it will be transmitted asymmetrically with respect to the central longitudinal axis 223 as energy will be emitted from the tip 201 and the filaments 206a, 206b. As oriented in FIG. 5, the energy will be biased in an upward direction in the direction from the point 301 toward the midpoint 502. Thus, when RF energy is transmitted during an RF neurotomy procedure, a lesion will be created that is correspondingly offset from the central longitudinal axis 223 in the direction from the point 301 toward the midpoint 502.

[0071] FIG. 6 is a side view of the tip 201 and filaments 206a, 206b oriented such that deployed filament 206b is disposed entirely within the plane of the figure. The filaments 206a, 206b extend from the tip 201 at a common distance, or location, along the central longitudinal axis 223. The filament 206b is deflected radially outwardly from the central longitudinal axis 223. The filament 206b emerges from the tip 201 at an angle 601 of about 30 degrees as dictated by the positioning of the transition region 305 relative to where the filament 206b is confined and on the mechanical properties of the filament 206b (as previously discussed). Also, it is noted that the distal tips 501a, 501b are positioned distally beyond the point 301 by a distance 602 and are disposed at a distance 603 from the central longitudinal axis 223. In the embodiment illustrated in FIG. 6, the distance 602 may be about 3.5 mm and the distance 603 may be about 3 mm. Such an arrangement may distally offset a lesion created by the needle 103 as compared to a lesion created with a tip without filaments or a lesion created with the needle 103 with the filaments 206a, 206b in the retracted position.

[0072] Accordingly, the filament 206a, 206b arrangement illustrated in FIGS. 2A, 3A, 3B, 5 and 6 may be operable to produce lesions that are radially offset from the central longitudinal axis 223 and distally offset from the point 301 as compared to a lesion created

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by the tip 201 without the filaments or a lesion created with the needle 103 with the filaments 206a, 206b in the retracted position.

[0073] Variations of filament positions and configurations from those illustrated in FIGS. 2A, 3A, 3B, 5 and 6 will now be addressed. Variations in the relative shapes, positions and sizes of lesions created with the needle 103 may be achieved by repositioning the filaments. For example, as noted above, the lesion produced by the needle 103 will be in different positions depending on whether the filaments are in the deployed or refracted positions. Accordingly, intermediately shaped, positioned and/or sized lesions may be achieved by positioning the filaments in intermediate positions between the fully deployed or refracted positions. Thus, for any given configuration of deployable filaments discussed herein, the positions and/or sizes of lesions created by those configurations may be varied by varying the positioning of the filaments to intermediate positions between the fully deployed and retracted positions. As noted above, the needle 103 with deployed filaments is operable to produce larger lesion volumes than the needle 103 with retracted filaments. For example, the needle 103 with fully deployed filaments may be operable to produce lesion volumes of about 500 mm^3.

[0074] Further variation in the shape, position and/or size of lesions created by needles with deployable filaments may be achieved by different configurations of filaments. Variations may include variations in materials, the number of filaments, the radial positioning of the filaments, the axial positioning of the filaments, the length of the filaments, the angle at which the filaments exit the tip, and the shape of the filaments. By varying these parameters the needle may be configured to produce lesions of various sizes and shapes that are positioned at various locations relative to the tip. Such variations may be specifically tailored to be used in specific procedures, such as RF neurotomy procedures of particular nerves adjacent to particular vertebrae.

[0075] Variations of the materials used for the tip and/or the filaments may be selected to achieve particular lesion sizes, positions and/or shapes. For example, the tip may be made form a material that does not conduct RF energy. In such an embodiment, RF energy from the RF probe 401 may be conducted by substantially only the deployed filaments. Such an arrangement may provide for a lesion with a larger offset from the central longitudinal

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axis 223 than would be produced where the tip conducts RF energy and acts as an electrode along with the filaments.

[0076] Another material-related variation that may affect lesion shape, size and/or position is the addition and placement of insulation over the tip and/or filaments. For example, by placing a layer of insulation over the proximal half of the portions of the filaments that extend from the tip when in the deployed position, the shape of the lesion may be altered since RF energy may primarily emanate from the distal, non-insulated portion of the filaments. Similarly, insulation may be added to the tip to alter the RF energy delivered from the tip.

[0077] Moreover, the materials used in making the filaments and tip may be selected based on RF conductivity. For example, by using a material for the tip that is less conductive of RF energy, the proportion of RF energy emanating from the tip as compared to that emanating from the filaments may be altered resulting in a corresponding change in lesion size, position and/or shape.

[0078] The RF needles and RF probes discussed herein may be constructed from materials that are Magnetic Resonance Imaging (MRI) compatible. As such, MRI equipment may be used to verify the positioning of such RF needles and/or monitor the progress of an ablation procedure (e.g., RF neurotomy) using such RF needles.

[0079] Variations of the number of filaments used for needle may be selected to achieve particular lesion sizes, positions and/or shapes. For example, as illustrated in FIG. 7, a third filament 701 may extend from tip 201' in a position between filaments 206a, 206b. The tips 501a, 501b of the filaments 206a, 206b and a tip 702 of filament 701 may form a polygon 703 that has a centroid 704. The centroid 704 is offset from the central longitudinal axis 223. Such an arrangement may produce a lesion that is offset from the central longitudinal axis 223 to a different degree than, and shaped differently than, a lesion created by the needle of FIG. 5. In general, where a centroid of a polygon formed by the tips of filaments (or, in the case where there are two filaments, the midpoint between them) is offset from the central longitudinal axis 223, a lesion created by such a configuration will be correspondingly offset from the central longitudinal axis 223. The filaments 206a, 206b, 702 are positioned within the same filament angle 503 of about 120 degrees as in the embodiment

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of FIG. 5. Furthermore, the embodiment of FIG. 7 has a filament-free angle 504 of about 240 degrees, also the same as in the embodiment of FIG. 5. In general, where the filaments are positioned within an arc that is less than 180 degrees, resultant lesions will be offset from the central longitudinal axis 223 in the direction of the filaments. In general, in an embodiment consisting of three or more filaments where the filaments are positioned within an arc that is less than 180 degrees, the filament-free angle may be correspondingly greater than 180 degrees (e.g., greater than 200 degrees or greater than 240 degrees).

[0080] Variations in the radial positioning of filaments of a needle may be selected to achieve particular lesion sizes, positions and/or shapes. For example, as illustrated in FIG. 8, four filaments 801a-801d are positioned about a tip 201". The tips of the filaments 801a-801d may form a polygon 802 that has a centroid 803. Such an arrangement may produce a lesion whose center is offset from the central longitudinal axis 223 in the direction of the centroid 803. The filaments 801a-801d are positioned within a filament angle 804 of about 200 degrees. Furthermore, the embodiment of FIG. 8 has a filament-free angle 805 (i.e., the largest angle about the circumference of the tip 201" that is free of filaments) of about 160 degrees. It will be appreciated that, as illustrated in FIG. 8, a configuration capable of producing a lesion offset from the central longitudinal axis 223 may have a filament-free angle that is less than 180 degrees.

[0081] In the above-described embodiment of FIGS. 2A, 3A, 3B, 5, and 6 with two filaments, a midpoint 502 between the filaments was discussed. In embodiments with more than two filaments, a centroid of a polygon formed by the distal ends of the filaments was discussed. Both the midpoints and the centroids may be considered to be "average" points of the filaments for their particular configurations. In such embodiments, the midpoint between filaments in two-filament embodiments and the centroid of the polygon in embodiments with more than two filaments may be offset from the central longitudinal axis of the elongate member. For example, the midpoint or centroid may be offset from the central longitudinal axis by 1 mm or more. In embodiments, the polygon may lie in a plane perpendicular to the central longitudinal axis.

[0082] As illustrated in, for example, FIGS. 2A, 3A, 3C, 5, 7, 8 and 9 the distal ends of the filaments when fully deployed may be disposed in a common plane. In an

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embodiment, the common plane may be disposed perpendicular to the central longitudinal axis. Such a common plane for the distal ends of deployed filaments may be disposed distally from the distal end of the tip.

[0083] As illustrated in, for example, FIGS. 2A, 3A, 3C, 5 and 7 the filaments of the needle may be deployed on a common side of a central plane of the needle (where the central longitudinal axis is disposed entirely within the central plane). In such embodiments, the distal ends of the fully deployed filaments may all be disposed on a common side of the central plane. Such a configuration may enable the needle to be used to create a lesion that is offset from the tip of the needle to the same side of the central plane as the deployed filament ends.

[0084] As illustrated, inter alia, in FIG. 2A, the filaments when fully deployed may point in an at least partially distal direction. In this regard, a vector extending axially from the distal end of a filament and coinciding with a central axis of the filament at the end of the filament has at least some distal component. Accordingly, the fully deployed filaments embodiments shown in FIGS. 2A, 3A and 10 all point in an at least partially distal direction.

[0085] In another variation of the radial positioning of filaments of a needle, the filaments may be uniformly distributed about the circumference of the tip. Such an embodiment is illustrated in FIG. 9. The needle of FIG. 9 includes 3 equally distributed filaments 901a, 901b, 901c. Consequently, the angles 902a, 902b, 902c between the filaments 901a, 901b, 901c may each equal 120 degrees. Such a needle may be operable to produce a lesion that is generally centered along the central longitudinal axis 223. However, the position of the produced lesion axially along the central longitudinal axis 223 may be determined by the configuration of the filaments. For example, relatively longer filaments may be operable to produce lesions that are positioned distal to lesions produced by configurations with relatively shorter filaments.

[0086] Variations in the axial positioning of where deployed filaments emerge from the tip of a needle may be selected to achieve particular lesion sizes, positions and/or shapes. For example, returning to FIG. 7, if the third filament 701 of the embodiment of FIG. 7 were axially positioned such that it is distal to filaments 206a, 206b, the resultant lesion may be produced may be longer along the central longitudinal axis 223 than that of an

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embodiment where the filaments 206a, 206b, 701 are positioned at the same point along the central longitudinal axis 223. In another variation, as deployed, two or more filaments may be disposed at the same radial position and at different axial positions. Such embodiments may include multiple rows of filaments.

[0087] The lengths of filaments beyond the tip (when the filaments are in the deployed position) in a needle may be varied to achieve particular lesion sizes, positions and/or shapes. For example, increasing the length of the deployed portions of the filaments 206a and 206b of the embodiment illustrated in FIGS. 5 and 6 may result in a needle capable of producing lesions that are more distally positioned than those created by the embodiment as shown in FIGS. 5 and 6. The effects of lengthening or shortening the deployed length of the filaments are similar to those discussed above with respect to partially deploying filaments.

[0088] Embodiments of a needle may include deployed filaments of different lengths. Where all of the filaments of a particular needle are moved by a common actuator, such variations may be achieved by varying the overall length of the filaments. In such an embodiment, the end points of the shorter filaments may be retracted further into the tip or elongate member than longer filaments. The effects of lengthening or shortening the deployed length of the filaments are similar to those discussed above with respect to variations in the axial positioning of where deployed filaments emerge from the tip of the needle.

[0089] The angle (such as angle 601 of FIG. 6) at which a filament exits a tip may be varied to achieve particular lesion sizes, positions and/or shapes. For example, an embodiment similar to the embodiment of FIGS. 5 and 6, but where the deployed filaments are at a 60 degree angle instead of the 30 degree angle shown in FIG. 6, may be operable to produce a lesion that has a larger maximum cross-sectional dimension in a plane perpendicular to the central longitudinal axis 223 than the embodiment of FIGS. 5 and 6. This may be due to the filaments emanating RF energy at a distance further away from the central longitudinal axis than the embodiment of FIGS. 5 and 6. A particular embodiment of the needle may include deployed filaments at different angles relative to the central longitudinal axis.

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[0090] The shapes of the portions of the filaments that extend away from the tip may be varied to achieve particular lesion sizes, positions and/or shapes. For example, FIG. 10 illustrates the tip 201 and filaments 1001a, 1001b, where the portions of the filaments 1001a, 1001b that extend beyond the tip 201 are curved. Such curvatures may be achieved by, for example, filaments that comprise a shape memory alloy (e.g., Nitinol) or spring material. When the filaments 1001a, 1001b are retracted, the shape of the tip 201 and/or elongate member 203 may keep the filaments 1001a, 1001b in a constrained straightened position. As the filaments 1001a, 1001b are advanced toward the fully deployed position, they become unconstrained and return to their curved shape as shown in FIG. 10. The deployed shape of the filaments 1001a, 1001b may be predetermined, or the filaments 1001a, 1001b may be made from a material that may be shaped by a user prior to insertion.

[0091] The curved filaments 1001a, 1001b of FIG. 10 are positioned within planes that include the central longitudinal axis 223. In other embodiments, the filaments 1001a, 1001b may be curved in other directions, such as in a corkscrew arrangement. This may be beneficial to assist the filaments in remaining anchored to the tissue during delivery of RF energy. The curved filaments 1001a, 1001b of FIG. 10 may be operable to produce a flatter (in a plane perpendicular to the central longitudinal axis 223) lesion than the straight filaments 206a, 206b of FIG. 6.

[0092] FIG. 3C is a detailed view of the distal end 310 of a needle 309 that is an alternate embodiment of the needle 103. The distal end 310 includes a tip 311 that may include a sharpened point 312 for piercing the skin of a patient and facilitating advancement through tissue. The tip 311 may further include a tapered portion 313 that transitions the tip 311 from the point 312 to a first body portion 314. The first body portion 314 may be connected to a second body portion 315 at an angle 316. In an exemplary embodiment, the angle 316 may be about 15°. The second body portion 315 may be aligned with an elongate member 317. The elongate member 317 may be similarly configured as the elongate member 203 of FIGS. 3A and 3B. The angle 316 between the first body portion 314 and the second body portion 315 may aid the physician in navigating the needle 309 to a desired position. For example, by rotating the needle 309 such that the first body portion 314 is pointing in a

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desired direction, subsequent advancement of the needle 309 may result in the needle 309 following a non-straight path biased toward the desired direction.

[0093] The first and second body portions 314, 315 may be cylindrical as illustrated, or they may be of any other appropriate shape. The first and second body portions 314, 315 may have cross-sections that coincide with the cross section of the elongate member 317.

[0094] The tip 311, or a non-insulated portion thereof, may act as an RF energy delivery element. As such, the tip 311 may be made from a conductive material such as, for example, stainless steel. The tip 311 may be coated. The tip 311 material and optional coating may be selected to improve radiopacity, improve and/or alter RF energy conduction, improve lubricity and/or reduce tissue adhesion.

[0095] The tip 311 may include filament slot 318a and filament slot 318b. The geometry of the filament slots 318a, 318b may be selected to allow filaments 319a, 319b to be adequately retracted (e.g., such that they are disposed within a cross-sectional envelope of the second body portion 315) while the needle 309 is inserted into the body, so that the filaments 319a, 319b do not cause any unintended damage to the patient. Such positioning of the filament slots 318a, 318b avoids having filament exit features on the tapered portion 313 and on the first body portion 314 and thus avoids potential coring that could be caused by such positioning.

[0096] The internal geometry of the filament slots 318a, 318b may be designed such that the filaments 319a, 319b may be retracted and advanced. For example, the internal geometry of the filament slots 318a, 318b may be configured such that advancement of the filaments 319a, 319b relative to the filament slots 318a, 318b, will cause the filaments 319a, 319b to be deflected outwardly as the filaments 319a, 319b move distally relative to the second body portion 315. Depending on the configuration of the filament slots 318a, 318b and on the mechanical properties of the filaments 319a, 319b, various deployment angles of the filaments 319a, 319b relative to a central longitudinal axis of the second body portion 315 may be achieved.

[0097] The configuration and orientation of the filament slots 318a, 318b may be selected such that deployed filaments 319a, 319b may achieve the positioning illustrated in

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FIG. 3C. In FIG. 3C, the filaments 319a, 319b are generally positioned in a plane that is perpendicular to a plane that includes the angle 316 between the first and second body portions 314, 315. As illustrated, the filaments 319a, 319b may be positioned such that they extend at an angle relative to the plane that includes the angle 316. Other filament slot 318a, 318b configurations may be configured to achieve other desired filament 319a, 319b placements. These configurations may be achieved by varying the quantity of filament slots and filaments, the placement of filament slots about the circumference of the tip 311, the angle at which the filaments extend away from the first and second body portions 314, 315, and/or the placement of filament slots along the first and second body portions 314, 315.

[0098] Similar to the embodiment of FIGS. 3A and 3B, the needle 309 may comprise a tube that includes a lumen therethrough. The lumen may be employed to accept an RF probe for delivery of RF energy and/or for the transport of fluids. In this regard, the tip 311 may further include a fluid port 320 that may be in fluid communication via a channel through the tip 311 with the lumen. The fluid port 320 may be used to transfer fluid between the region of the tip 311 and a proximal end of the needle 309.

[0099] In the deployed position as shown in FIG. 3C, the distal ends of the filaments 319a, 319b are disposed away from the tip 311. In a retracted position (not shown, but similar to as shown in FIG. 3B), the distal ends of the filaments 319a, 319b are disposed entirely within an outer perimeter (e.g., circumference where the second body portion 315 of the tip 311 is round) of the tip 311. In the deployed position, the filaments 319a, 319b act as broadcast antennae for an RF probe inserted into the needle 309. In this regard, together, the RF probe inserted into the lumen, the tip 311, and the filaments 319a, 319b, may form a monopolar electrode for application of RF energy to the target volume. The filaments 319a, 319b may allow the RF energy from the RF probe to be dispersed over a larger volume than would be possible with the tip 311 alone.

[0100] The filaments 319a, 319b may be constructed in a manner similar to as described with respect to the filaments 206a, 206b.

[0101] In general, any or all of the above variables may be incorporated into a particular embodiment of a needle to yield a needle capable of producing a lesion with a particular size, position and shape relative to the tip of the needle. Such custom sizes,

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positions and shapes may be designed for specific procedures. For example, a particular lesion size, position and shape may be selected to enable a physician to navigate the needle to a particular landmark (e.g., proximate or touching a bone visible using fluoroscopy) and then orient the needle such that deployed filaments will be operable to produce a lesion at a particular location relative to the landmark. By navigating to a particular internal landmark, as opposed to attempting to visualize a relative position of a needle offset from a landmark, a more accurate and/or consistent positioning of the needle may be achieved. In this regard, the skill level required to accurately position the needle for a particular procedure may be reduced.

[0102] The lesion shapes achievable through selection of the above variables may include, for example, generally spherical, oblong, conical, and pyramidal shapes. The orientation relative to, and the amount of offset from, the tip of such shapes may be selectable. In an embodiment, the tips of the deployed filaments may be positioned distally relative to the point of the tip to provide for a facile positioning of the lesion relative to the tip. Such capability may allow for the needle to be inserted directly toward a target volume. In other embodiments, the tips of the deployed filaments may be positioned at the same axial position along the central longitudinal axis as the point of the tip or the tips of the deployed filaments may be positioned proximally relative to the point of the tip. In other embodiments, some filament endpoints may be located distal to the point of the tip while others are disposed proximal to the point of the tip.

[0103] In the embodiment of FIGS. 2A, 2B, 3A, 3B, 5 and 6, the filaments 206a, 206b have been illustrated as running the entire length of the elongate member 203 from the filament hub 221 to the tip 201. In an embodiment, a single member may run along at least part of the elongate member 203 and the filaments may be interconnected to the single member at some point proximal to the tip 201. Furthermore, the filaments 206a, 206b have been illustrated as being straight within the elongate member 203. In alternate embodiments, the filaments within the elongate member 203 may be braided, wrapped or twisted together. Such embodiments may have increased column strength, providing resistance to buckling and/or bending within the elongate member 203.

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[0104] The filaments discussed herein may be encased within lumens sized to help prevent buckling or bending of the filaments within the elongate member 203. Such lumens may be part of the elongate member or they may be separate members (e.g., tubes within the elongate member). Such lumens may be formed by an inner member (not shown) within the elongate member where the inner member includes channels along its periphery in which the filaments may lie with the elongate member forming a portion of the lumens. Lumens used for filaments may also serve as lumens for the transfer of liquid to and/or from the region surrounding the tip. In another variation, the filaments may be hollow and may be used for transfer of liquid to and/or from the region surrounding the tip.

[0105] The illustrated embodiments show all of the filaments of a given embodiment as commonly deployed or refracted. In a variation, one or more filaments may be separately deployed and/or refracted such that the physician could selectively engage a desired number of elements. In another variation, a plurality of filaments may exit from the tip at a common location and form a fan-like arrangement as they are deployed.

[0106] Deployment of filaments discussed above has been described as the filaments moving relative to a stationary tip. Alternatively, embodiments may be deployed by pulling the tip back relative to the filaments. Such embodiments may be beneficial where the needle is initially advanced such that it is in contact with bone to ensure proper positioning. Then the tip may be withdrawn, leaving the filaments (e.g., curved shape memory filaments) in a precise, known position.

[0107] Returning to FIGS. 2A and 2B, as noted, the hub 204 may be fixedly attached to the elongate member 203. The hub 204 may be the primary portion of the needle 103 gripped by the physician during insertion and manipulation of the needle 103. The hub 204 may have an asymmetric feature, such as indicator 225, that is oriented in a known fashion relative to the asymmetry of the tip 201. In this regard, the indicator 225 may be used to communicate to the physician the orientation of the tip 201 within the patient 101. Internally, the hub 204 may include a cavity 213 sized to house a protrusion 218 of the actuator 216. The hub 204 may include a hole through which a projection 215 may project into the interior of the cavity 213 to control the motion of the actuator 216 relative to the hub

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204 and to secure the actuator 216 to the hub 204. The hub 204 may be made from any appropriate material, e.g., a thermoset plastic.

[0108] The actuator 216 may be used to control the motion to deploy and/or retract the filaments 206a, 206b. The actuator 216 is operable to move along the central longitudinal axis 223 relative to the hub 204, elongate member 203 and tip 201. The actuator 216 includes the protrusion 218 extending into the cavity 213 of the hub 204. The outer surface of the protrusion 218 includes a helical track 219 sized to accommodate the projection 215. In this regard, as the actuator is rotated relative to the hub 204 (e.g., by a physician to deploy the filaments 206a, 206b), the helical track 219 and projection 215 combine to cause the actuator 216 to move axially along the central longitudinal axis 223. The actuator 216 has an interface portion 217 that may be gripped by a user when twisting the actuator 216. The interface portion 217 may be knurled or otherwise textured to enhance the physician's ability to twist the actuator 216. The protrusion 218 may include an inner cavity 226 sized to accept the filament hub 221 and to allow the filament hub 221 to rotate freely relative to the actuator 216. In this regard, the linear motion of the actuator 216 may be transmitted to the filament hub 221 while the rotational motion of the actuator 216 may not be transmitted to the filament hub 221.

[0109] The actuator 216 may include a Luer fitting 220 or any other appropriate fitting type on a proximal end thereof. The Luer fitting 220 may be in fluid communication with the lumen 222 and provide a connection such that fluid may be delivered into the lumen 222 and to the fluid port 210 of the tip 201. The Luer fitting 220 may also be configured to allow for the insertion of the RF probe 401 into the lumen 222. The actuator 216 may be made from any appropriate material.

[0110] The filaments 206a, 206b may be fixedly interconnected to the filament hub 221. In this regard, the axial movement of the filament hub 221 due to the actuator 216 may be communicated to the filaments 206a, 206b to deploy and retract the filaments 206a, 206b when the actuator 216 is rotated. The filament hub 221 may be made from any appropriate material.

[0111] Thusly, the physician may be able to deploy or retract the filaments 206a, 206b by twisting the actuator 216. For example, as illustrated, a counterclockwise (as seen

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from the viewpoint of FIG. 5) rotation of the actuator 216 relative to the hub 204 will result in the deployment (extension) of the filaments 206a, 206b. Relatedly, a clockwise rotation of the actuator 216 relative to the hub 204 will result in the retraction of the filaments 206a, 206b. Additionally, by partially rotating the actuator 216 relative to the hub 204, the filaments 206a, 206b may be partially deployed or refracted. The actuator 216 and/or the hub 204 may include markings to indicate the position of the filaments 206a, 206b (e.g., the depth of deployment). The actuator 206 and/or hub 204 may include detents to provide a tactile feedback of the position of the filaments 206a, 206b.

[0112] Other types of mechanisms may be used to control the deployment and retraction of the filaments 206a, 206b. For example, a spring loaded mechanism may be used. Such a configuration may use a spring that acts upon the filaments 206a, 206b to bias the filaments 206a, 206b toward a predetermined position (e.g., either deployed or retracted). Such a mechanism may be analogous to a spring loaded mechanism used in retractable ballpoint pens. In another example, a roll clamp mechanism may be incorporated. A roller wheel could be incorporated into the hub 204 such that as the wheel is rotated with the user's thumb, the filaments 206a, 206b would advance or retract. In another example, the hub 204 and actuator 216 may interact via complimentary threaded features. As the actuator 216 is threaded into the hub 204, the filaments 206a, 206b would advance. As the actuator 216 is threaded out of the hub 204, the filaments 206a, 206b would retract. In another example, a Touhy-Borst type mechanism could be incorporated to control the deployment and retraction of the filaments 206a, 206b. Any other appropriate mechanism for controlling linear motion of the filaments 206a, 206b may be incorporated into the needle 103.

[0113] FIG. 2C is a cut away view of a portion of an alternate embodiment of a hub 231 and actuator 232 that may be part of RF needle 103 used in an RF neurotomy procedure. The hub 231 may be fixedly attached to the elongate member 203. The hub 231 may be the primary portion of the needle 103 gripped by the physician during insertion and manipulation of the needle 103. The hub 231 may have an asymmetric feature, such as indicator 233, that is oriented in a known fashion relative to the asymmetry of the tip 201. In this regard, the indicator 233 may be used to communicate to the physician the orientation of the tip 201 within the patient 101. Internally, the hub 231 may include a cavity 234 sized to

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house a protrusion 235 of a slide member 236. The protrusion 235 may include a keyway or key slot 237 that may run along a longitudinal direction of the protrusion 235. The internal surface of the hub 231 through which the protrusion 235 moves may include a mating key (not shown) configured to fit and slide within the key slot 237. Together, the key slot 237 and mating key of the hub 231 may limit the slide member 236 to a linear motion along the central longitudinal axis 223.

[0114] Filaments 206a, 206b may be fixedly connected to the protrusion 235 of the slide member 236 for movement therewith. In this regard, distal movement (e.g., movement to the right as shown in FIG. 2C) of the protrusion 235 relative to the hub 231 may cause extension of the filaments 206a, 206b relative to the hub 231, elongate member 203 and tip 201 (not shown in FIG. 2C). For example, distal movement of the protrusion 235 may be used to move the filaments 206a, 206b from a retracted position to a deployed position. Similarly, proximal movement (e.g., movement to the left as shown in FIG. 2C) of the protrusion 235 relative to the hub 231 may result in retraction of the filaments 206a, 206b relative to the hub 231, elongate member 203 and tip 201 (not shown in FIG. 2C).

[0115] The hub 231 may be made from any appropriate material, e.g., a thermoset plastic. The hub 231 may be at least partially transparent such that the position of the protrusion 235 and/or other components within the hub 231 may be observable by a user. The hub 231 may further include demarcations (e.g., molded or printed marks) such that the amount of extension of the filaments 206a, 206b may be determined from the position of the protrusion 235 and/or other components relative to the demarcations.

[0116] An actuator 232 may be used to control the motion to deploy and/or retract the filaments 206a, 206b fixedly connected to the protrusion 235. The actuator 232 may be generally tubular such that it may fit around a hub projection 238 projecting from the proximal end of the hub 231. At least a portion of the cavity 234 may be disposed within the hub projection 238. The actuator 232 may also include an annular feature 239 configured to fit within an annular slot 240 in the slide member 236. The annular feature 239 may be sized relative to the annular slot 240 such that the actuator 232 may rotate relative to the slide member 236 about the central longitudinal axis 223 (or an axis parallel thereto) while the position of the actuator 232 relative to the slide member 236 along the central longitudinal

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axis 223 remains fixed. In this regard, the actuator 232 and the slide member 236 may be configured to move in tandem relation along the central longitudinal axis 223. The annular feature 239 and annular slot 240 may be configured such that, during assembly, the actuator 232 may be pressed onto the slide member 236 and the annular feature 239 may snap into the annular slot 240.

[0117] The inner surface of the actuator 232 may include a helical track 241 sized to accommodate a corresponding mating helical thread 242 on the hub projection 238. In this regard, as the actuator 232 is rotated relative to the slide member 236 and hub 231 (e.g., by a physician to deploy the filaments 206a, 206b), the helical track 241 and helical thread 242 combine to cause the actuator 232 and the slide member 236 to move axially along the central longitudinal axis 223. In this regard, a linear motion of the slide member 236 relative to the hub 231 may be created while the rotational motion of the actuator 232 may not be transmitted to the slide member 236 and the hub 231. An outer surface of the actuator 232 may be textured or include features to assist the user in gripping and twisting the actuator 232. In an alternative configuration, the helical track 241 may be disposed on the hub projection 238 and the helical thread 242 may be disposed on the inner surface of the actuator 232.

[0118] The slide member 236 may include a Luer fitting 243 or any other appropriate fitting type on a proximal end thereof. The Luer fitting 243 may be in fluid communication with a lumen passing through the slide member 236 and may provide a connection such that fluid may be delivered through the Luer fitting 243 and into the lumen of the slide member 236. In turn, the lumen of the slide member 236 may be in fluid communication with the cavity 234 of the hub 231, which may in turn be in fluid communication with a lumen disposed within the elongate member 223. The lumen disposed within the elongate member 223 may be in fluid communication with the tip 201. In this regard, fluid may flow into the Luer fitting 243, into and through the lumen within the slide member 236, into and through the cavity 234 of the hub 231, into and through the elongate member 223, and out from the tip 201. The Luer fitting 243, the lumen within the slide member 236, the cavity 234 of the hub 231, and the lumen of the elongate member 223 may all also be configured to allow for the insertion of the RF probe 401 therethrough. Moreover,

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the protrusion 235 and cavity 234 of the hub projection 238 may be sized and/or configured to form a fluid seal therebetween. Accordingly, fluid delivered under pressure through the Luer fitting 220 may flow through the cavity 238 and into the elongate member 203 substantially without leaking past the interface between the protrusion 235 and the cavity 234 of the hub projection 238.

[0119] As noted, the filaments 206a, 206b may be fixedly interconnected to the slide member 236. In this regard, the axial movement of the slide member 236 due to the actuator 232 may be communicated to the filaments 206a, 206b to deploy and retract the filaments 206a, 206b when the actuator 232 is rotated. The slide member 236 may be made from any appropriate material. The actuator 232 may be made from any appropriate material.

[0120] Thusly, the physician may be able to deploy or retract the filaments 206a, 206b by twisting the actuator 232. Additionally, by partially rotating the actuator 232 relative to the hub 231, the filaments 206a, 206b may be partially deployed or refracted. The actuator 232 and/or hub 231 may include detents to provide a tactile feedback of the position of the filaments 206a, 206b. The detents may be configured such that tactile feedback associated with engagement of a detent coincides with a predetermined amount of deployment or retraction of the filaments 206a, 206b. In this regard, such tactile feedback may be used in determining filament position.

[0121] In alternate embodiments, the needle 103 may be a bipolar device instead of the monopolar device described above. In such embodiments, the filaments may be isolated from each other and the tip to enable bipolar operation. Where more than two filaments are included, elements may be included to allow for selection of the polarity of the filaments to aid in lesion shape, size and position control. In another variation, the needle 103 may be used in either a monopolar or a bipolar mode as selected by the physician.

[0122] The above-described embodiments of needles may used in spinal RF neurotomy procedures, which will now be described. In general, for an RF neurotomy procedure, the patient may lie face down on a table so that the spine of the patient is accessible to the physician. At any appropriate time before, during, and/or after the procedure, the physician may use imaging equipment, such a fluoroscope, to visualize the

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patient's anatomy and/or to visualize the positioning of equipment (e.g., the needle relative to a target volume).

[0123] The patient may be administered sedatives and/or intravenous fluids as appropriate. The skin of the patient surrounding where the procedure will take place may be prepared and maintained using an appropriate sterile technique. Where the needle is a monopolar device, a return electrode pad may be attached to the patient. A local anesthetic may be injected subcutaneously where the needle will be inserted. Anesthetic may also be administered along the approximate path the needle will take.

[0124] With the filaments in the retracted position, the needle may be introduced into the patient and moved to a target position relative to a target portion of a target nerve or to a target position relative to a target volume in which the target nerve is likely situated (all of which are generally referred to herein as the target nerve or portion of the target nerve). The target nerve may be an afferent nociceptive nerve such as, for example, a medial branch nerve proximate a lumbar facet joint. Introduction into the patient may include percutaneously using the tip of the needle to pierce the skin of the patient. The moving of the needle may include navigating toward the target position using fluoroscopic guidance. Furthermore, the moving of the needle may include advancing the needle to an intermediate position and then repositioning the needle to the target position. For example, the needle may be advanced until it contacts a bone or other structure to achieve the intermediate position. This may be followed by retracting the needle a predetermined distance to achieve the target position. Such a procedure may be facilitated by the markers 224 or collar previously discussed.

[0125] During the moving of the needle or after the target position has been achieved, the needle may be used to inject an anesthetic and/or a dye. The dye may increase contrast in fluoroscopic images to assist in visualizing the patient's anatomy, which may aid the physician in guiding and/or verifying the position of the needle.

[0126] The needle may be rotated about the central longitudinal axis of the elongate member of the needle to achieve a desired orientation relative to the target nerve. For example, the needle may be rotated such that a lesion created with the needle with the filaments deployed will be offset from the central longitudinal axis toward the target nerve.

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Such rotation of the needle may be performed prior to insertion of the needle into the patient and/or after insertion into the patient. For example, the physician may rotate the needle prior to insertion such that the needle is generally in the desired rotational orientation. Then, after achieving the target position, the physician may fine tune the rotational orientation of the needle by rotating the needle to a more precise orientation.

[0127] Once the target position and desired rotational orientation have been achieved, the next step may be to advance one or more filaments of the needle relative to the tip of the needle. The particular needle used for a procedure may have been selected to enable the creation of a particular sized and shaped lesion at a particular position relative to the needle. As such, the particular needle used may be of any appropriate configuration (e.g., any appropriate number of filaments, any appropriate filament positioning) discussed above.

[0128] Where the needle is configured as shown in FIG. 5, the advancement of filaments may include advancing the filaments such that when the filaments are in their respective deployed positions, a midpoint between a distal end of the first filament and a distal end of the second filament is offset from the central longitudinal axis of the needle and the filament endpoints are disposed distal to the tip of the needle. Such deployment may enable the needle to be used to create a lesion that is offset from the tip of the needle toward the midpoint between the deployed filament ends. The lesion created may also be positioned at least partially distal to the tip of the needle.

[0129] FIG. 11A is an illustration of an exemplary set of isotherms 1010a-1010c that may be created with the needle 103 of FIG. 2A. As illustrated by the set of isotherms 1010a-1010c, RF energy emanating from the tip 201 and filaments 206a, 206b, may produce a region of elevated temperatures disposed about the tip 201 and filaments 206a, 206b. The isotherms 1010a-1010c may be offset from the central longitudinal axis 223 such that a centroid of the isotherms as viewed in FIG. 11A is offset from the central longitudinal axis 223 in the direction of the filaments 206a, 206b. The centroid of the isotherms 1010a-1010c as viewed in FIG. 11A may also be disposed distally relative to the tip 201 such that it is disposed between the tip 201 and the distal ends of the deployed filaments 206a, 206b. The isotherms 1010a-1010c may also be shaped such that, as viewed in FIG. 11A, the isotherms 1010a-1010c have a maximum cross dimension along the central longitudinal axis 223 that is

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greater than a maximum cross dimension in the plane of FIG. 11A perpendicular to the central longitudinal axis 223. Similarly, as shown in FIG. 11B discussed below, the isotherms 1010a-1010c may have a maximum cross dimension along the central longitudinal axis 223 that is greater than a maximum cross dimension perpendicular to the plane of FIG. 11A and perpendicular to the central longitudinal axis 223.

[0130] The offset of the centroid of the isotherms 1010a-1010c from the central longitudinal axis 223 results in greater lesion width in a plane perpendicular to the central longitudinal axis 223, as compared to a similarly sized straight needle with no filaments. The offset of the centroid of the isotherms 1010a-1010c also allows for projection of the centroid of a corresponding lesion volume in a direction away from the central longitudinal axis 223. By way of example, such offsets may advantageously enable the execution of the exemplary procedures described herein. In addition, such offsets may advantageously enable the creation of lesion volumes distal (relative to the needle 103) to potentially interfering structures (e.g., an ossified process). Moreover, such offsets may advantageously enable the needle 103 to be inserted into a patient at a more desirable angle (e.g., closer to perpendicular to the surface of the patient such as within 30° of perpendicular to the surface of the patient) than would be required using a needle without offset lesion capabilities.

[0131] FIG. 11B is an illustration of an exemplary lesion 1011 that may be created with the needle 103 of FIG. 2A. In FIG. 11B, the needle 103 has been placed perpendicular to a surface 1012. The surface 1012 may, for example, be the surface of a bone, such as a lumbar vertebra. As illustrated, the filaments 206a, 206b are deployed such they are proximate to the surface 1012. As such, the lesion 1011 has a width along the surface 1012 that is wider than would be created by the needle 103 if the filaments 206a, 206b were not deployed. Such capabilities may, for example, be advantageous where a target structure (e.g., a nerve) is known to be positioned along the surface 1012, but its exact position is unknown. In such a case, the needle 103 may be positioned generally perpendicular to the surface 1012 to achieve the illustrated lesion width along the surface 1012, whereas the needle 103 without the filaments 206a, 206b deployed, would require either multiple repositioning steps or for the needle 103 to be placed generally parallel to the surface 1012 to achieve the same lesion width along the surface 1012.

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[0132] FIG. 11C is an illustration of an exemplary lesion 1022 that may be created with a single-filament needle 1020. The single-filament needle 1020 is similar to the needle 103 with a difference that the single-filament needle 1020 includes only a single filament 1021. The filament 1021 may be configured similarly to the filaments 206a, 206b. The single-filament needle 1020 with the filament 1021 deployed may be operable to produce a lesion 1022 that is a flattened version (e.g., thinner in a direction perpendicular to the central longitudinal axis 223--the left to right direction as illustrated in FIG. 11C) of a lesion that may be produced by the needle 103 with its filaments 206a, 206b deployed. The capability to produce such a lesion shape may be beneficial when it is desirable to have a relatively large lesion in a particular direction (e.g., to compensate for the variability of location of a target nerve) and a relatively small lesion width in another direction (e.g., to avoid a structure such as viscera or a patient's skin).

[0133] Where the needle is configured such that all of the filaments of the needle are deployed on a common side of a central plane of the needle (where the central longitudinal axis is disposed entirely within the central plane), the advancement of filaments may include advancing the filaments such that when the filaments are in their respective deployed positions, the distal ends of all of the filaments are disposed on a common side of the central plane. Such deployment may enable the needle to be used to create a lesion that is offset from the tip of the needle to the same side of the central plane as the deployed filament ends. The lesion created may also be positioned at least partially distal to the tip of the needle.

[0134] Where the needle is configured as shown in FIG. 8, the advancement of filaments may include advancing the filaments such that when the filaments are in their respective deployed positions, each filament distal end defines a vertex of a polygon whose centroid is offset from a central longitudinal axis of the needle. Such deployment may enable the needle to be used to create a lesion that is offset from the tip of the needle toward the centroid. The lesion created may also be positioned at least partially distal to the tip of the needle.

[0135] The advancement of the filaments may be achieved using any of the mechanisms discussed above. For example, in the embodiment of FIG. 2A, rotating the

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actuator 216 relative to the hub 104 may cause the filaments to advance to the deployed position. The advancement of the filaments may be performed such that each of the plurality of filaments passes through a surface of the needle that is parallel to the central longitudinal axis of the needle. In an embodiment, the filaments of the needle may be advanced to a position that is an intermediate position between the retracted position and the fully deployed position. The degree of deployment may be based on the desired lesion size and/or the accuracy of the placement of needle. For example, the same needle may be used in two different procedures where the variability of the location of a target nerve is greater in the first procedure than it is in the second procedure. In such situation, the greater deployment of the filaments may be used in the first procedure, whereas in the second procedure, a smaller degree of deployment may be used since a smaller lesion may suffice to ensure that the target nerve has been lesioned. In another example, after placement of the needle during a procedure, the position of the needle may be determined to be slightly offset from a target position. In such a case, the filaments may be deployed to a greater degree than would have been required if the needle were placed exactly on target. In such a case, the greater degree of deployment may be used to compensate for the needle positioning inaccuracy. In such a case, needle repositioning and possible associated trauma may be avoided.

[0136] After advancing the filaments to the deployed position, their positions may be confirmed using the imaging system (e.g., using a fluoroscope). Furthermore, proper positioning may be verified by using the needle to stimulate the target nerve. An electrical signal (e.g., up to about 2 volts applied at about 2 Hz) may be applied to the needle and the physician may observe any related patient movement (e.g., muscle fasciculation in the territory supplied by the nerve). In another example, an electrical signal (e.g., up to about 1 volt applied at about 50 Hz) may be applied to the needle and the patient may indicate if they feel any associated sensations and their locations to assist in verifying correct needle positioning. Such stimulation (either physician-observed or patient reported) may be used to stimulate a targeted nerve to determine if the deployed position is adequate to achieve denervation of the targeted nerve. In this regard, it is desirable for the stimulation to affect the targeted nerve.

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[0137] Such stimulation may be used to attempt to stimulate a nerve that is not targeted for denervation (e.g., a nerve where no denervation is desired) to determine the position of the needle relative to such a non-targeted nerve. In this regard, if the stimulation signal does not stimulate the non-targeted nerve, it may be assumed that the position of the needle relative to the non-targeted nerve is such that the application of RF energy to the needle will not result in significant damage to the non-targeted nerve. And if the stimulation does stimulate the non-targeted nerve, the needle may be repositioned to avoid damaging the non-targeted nerve. In this regard, it is desirable for the stimulation not to affect the non-targeted nerve.

[0138] After correct needle positioning has been verified (e.g., by imaging and/or patient response), an anesthetic may be injected through the needle.

[0139] After the filaments have been advanced to the desired position, the next step may be to apply RF energy to the needle using the interconnected RF generator. In embodiments that use a separate RF probe to deliver RF energy, the RF probe may be inserted into a lumen of the needle prior to application of the RF energy. Additionally, when using such a configuration, the application of RF energy may include applying RF energy to the RF probe and conducting the RF energy away from the probe by the tip and/or filaments.

[0140] The resultant RF energy emanating from the tip and filaments may generate heat that ablates the target nerve. Such ablation may be achieved by creating a lesion that includes the target nerve. It is desired that the target nerve be completely ablated to prevent incomplete neurotomy which may result in dysesthesia and patient discomfort. In an exemplary embodiment, a lesion with a maximum cross dimension of 8-10 mm may be created. Larger or smaller lesions may be created by varying filament characteristics (e.g., filament advancement distance) and/or RF energy levels. The created lesion may be offset from the central longitudinal axis of the needle. The center of the lesion may be positioned distal to the tip of the needle. Of note, since the RF energy is emanating from the tip and filaments, a particularly sized lesion may be created with a lower peak temperature (the maximum temperature experienced in the patient) than would be possible if a needle without filaments were to be used to create the same-sized lesion. For example, a particular lesion may be achieved with the needle with deployed filaments where the peak temperature is

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about 55-60° C., whereas creation of the same lesion using a needle without filaments could require a peak temperature of about 80° C. Such lower temperatures required by the needle with deployed filaments may result in greater patient safety.

[0141] Before, during, and after the application of RF energy, a temperature sensor (e.g., thermocouple) at or near the tip of the needle may be used to monitor the temperature at or near the tip. Such readings may be used as control signals (e.g., a feedback loop) to control the application of RF energy to the needle. If it is desired to ablate additional target nerves or to ablate an additional volume to ensure ablation of the original target nerve, the spinal RF neurotomy procedure may continue.

[0142] Where the particular needle is configured to create lesions offset from the central longitudinal axis of the needle, and the additional target nerve or target volume is within a volume that may be lesioned using the needle in its current position but in a different rotational orientation, the procedure may continue as follows. First, after the initial RF energy application, the filaments may be retracted into the needle. Once retracted, the needle may be rotated, and the filaments redeployed. Next, the reoriented needle may be used to at least partially ablate the additional target nerve or target volume. Such retargeting of ablation volumes without repositioning (e.g., without withdrawing the needle from the patient and reinserting), may result in reduced patient trauma as compared to known spinal RF neurotomy procedures which may require removal and reinsertion of a needle to achieve lesioning of the second target volume. Moreover, such retargeting of ablation volumes without repositioning may result in the ability to create uniquely shaped lesions from a single insertion position. Such shaped lesions may include, for example, lesions that are in the shape of two or more intersecting spheres. The steps of retracting the filaments, rotating the needle, redeploying the filaments, and applying RF energy may be repeated a plurality of times.

[0143] Where the additional target nerve or target volume is not within a volume that may be lesioned using the needle in its current position, the needle may be repositioned. Such repositioning may include partially or fully removing the needle from the patient and then repositioning the needle and repeating the above-described steps.

[0144] At any point where no additional lesioning is desired, the filaments of the needle may be retracted, and the needle may be removed from the patient. After removal of

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the needle, a sterile bandage may be placed over the needle insertion site or sites. The patient may then be held for observation and recovery from the effects of any sedative that may have been administered.

[0145] Examples of specific spinal RF neurotomy procedures will now be described. Generally, steps unique to each procedure will be discussed while steps common to any spinal RF neurotomy procedure (e.g., site preparation, needle removal) will not be further discussed. Each of the procedures is described as being performed with the needle 103 of FIGS. 2A-6. It will be appreciated that the variations in needle configuration discussed above may be used in these procedures. For example, to increase the offset of the created lesion relative to the central longitudinal axis, curved (e.g., FIG. 10) and/or partially insulated filaments may be used that may create a lesion with a greater offset from the central longitudinal axis than the embodiment of FIG. 2A-6.

[0146] 1. Lumbar RF Neurotomy of a Medial Branch Nerve Proximate a Lumbar Facet Joint.

[0147] This process may include using a needle that enables the creation of lesions which are offset from the central longitudinal axis of the needle. The procedure will be described as being performed on the L5 vertebra 1101 using FIG. 12 and the needle 103 of FIG. 2A. It should be understood that other embodiments of needles described herein may be used in the procedure.

[0148] The lumbar RF neurotomy process may include positioning the tip 201 of the needle 103 (e.g., using fluoroscopic navigation) such that it is in contact with, or proximate to the groove 1102 between the transverse 1103 and superior articular 1104 processes of the targeted lumbar vertebra 1101. Such positioning is shown in FIG. 12. By contacting the lumbar vertebra 1101, a positive determination of the position of the needle 103 may be made. By way of example, such positioning may be performed such that the needle 103 is within 30° of being perpendicular to the lumber vertebra 1101 at the point of contact with the lumbar vertebra 1101, or at the point of the lumbar vertebra 1101 closest to the tip 201 of the needle 103. Optionally, from such a position, the needle 103 may be retracted a predetermined amount (e.g., between about 3 mm and 5 mm) as measured by

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markers 224 on the needle 103, as determined using the collar about the elongated member 203 discussed above, and/or by fluoroscopic navigation.

[0149] The process may include rotating the needle 103 such that the midpoint 502 is oriented toward the superior articular process 1104 and a medial branch nerve 1105 that is positioned along a lateral face 1106 of the superior articular process 1104. Next, the filaments 206a, 206b may be advanced to the deployed position (as shown in FIG. 12). The position of the needle 103 and deployed filaments 206a, 206b may be verified using fluoroscopy and/or patient stimulation. The RF probe 401 may then be inserted into the lumen 222 such that RF energy emanating from the probe 103 will be conducted by the tip 201 and filaments 206a, 206b to the target medial branch nerve 1105 and away from the intermediate branch of the posterior primary ramus.

[0150] Next, RF energy may be applied to the RF probe 401. The RF energy emanating from the needle 103 may be preferentially biased toward the target medial branch nerve 1105. The lesion created by such a procedure may, for example, have a maximum cross dimension of 8-10 mm, and may ablate a corresponding portion of the medial branch nerve 1105, thus denervating the facet joint.

[0151] In a variation, the needle may be operable to create a generally symmetric lesion relative to its central longitudinal axis. In such a variation the sequence of steps may include insert needle, deploy filaments, and apply RF energy.

[0152] In another variation, the needle may be inserted so it is positioned along the length of a portion of the nerve (as illustrated by needle 103'). Such positioning is similar to known methods of RF neurotomy performed with needles without filaments. After positioning the needle, the filaments may be deployed and a lesion may be created. As noted above, a needle with deployable filaments that is capable of producing a lesion equivalent to that of a needle without deployable filaments may be smaller in diameter than the needle without deployable filaments. Accordingly, although the positioning of needle 103' may be similar to known processes, the process utilizing the needle with deployable filaments may cause less trauma and be safer than procedures using a needle without deployable filaments due to the smaller size of the needle with deployable filaments. Moreover, as discussed above, the peak temperatures required to produce the desired lesion volume may be less when

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using the needle with deployable filaments as compared to the needle without deployable filaments, further contributing to patient safety. Furthermore, the filaments of needle 103' may be partially or fully deployed to achieve a desired lesion location, shape and/or size.

[0153] It is noted that the illustrated deployment of needle 103 with the filaments 206a, 206b deployed may be used to create a lesion that approximates a lesion that would be created with the a prior art (non filament) needle placed in the position of needle 103' (e.g., parallel to the target nerve 1105). Moreover, the placement of needle 103 generally perpendicular to the surface of the L5 vertebra 1101 may be less difficult to achieve than the parallel placement of the needle 103'.

[0154] 2. Sacroiliac Joint (SIJ) RF Neurotomy of the Posterior Rami.

[0155] This process may include using a needle that enables the creation of lesions which are offset from the central longitudinal axis of the needle. The procedure will be described as being performed on the posterior rami 1201 of the SIJ referencing FIG. 13 and using the needle 103 of FIGS. 2A-6. It should be understood that other embodiments of needles described herein may be used in the procedure.

[0156] As part of the SIJ RF neurotomy process, it may be desirable to create a series of lesions in a series of lesion target volumes 1203a-1203h lateral to the sacral foramina 1211, 1212, 1213 of a side of the sacrum 1200 to ablate posterior rami 1201 that are responsible for relaying nociceptive signals from the SIJ. Since the exact positions of the rami 1201 may not be known, lesioning such a series of target volumes 1203a-1203h may accommodate the variations in rami 1201 positions. The series of target volumes 1203 may be in the form of one or more interconnected individual target volumes, such as target volumes 1203a and 1203b. In addition, the process may include an additional lesion 1208 between the L5 vertebra 1209 and the sacrum 1200.

[0157] The SIJ RF neurotomy process may include positioning the tip 201 of the needle 103 (e.g., using fluoroscopic navigation) such that it is in contact with, or proximate to, and in lateral relation to the S1 posterior sacral foraminal aperture (PSFA) 1211 at a first point 1204 that is at the intersection of the two target volumes 1203a and 1203b. Such positioning may be performed such that the needle 103 is oriented within 30° of being perpendicular to the sacrum 1200 at the point of contact (or at the point of the sacrum 1200

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closest to the tip 201 of the needle 103). By contacting the sacrum 1200, a positive determination of the position of the needle 103 may be made. Optionally, from such a position, the needle 103 may be retracted a predetermined amount (e.g., between 3 mm and 5 mm) as measured by markers 224 on the needle 103, as determined using the collar about the elongated member 203 discussed above, and/or by fluoroscopic navigation. For example, a contralateral posterior oblique view may be obtained to ascertain that the tip 201 has not entered the spinal canal. For example, a fluoroscopic view may be obtained looking down the length of the needle 103 to verify that the needle 103 is properly offset from the S1 PSFA 1211 and/or a fluoroscopic view may be obtained looking perpendicular to the central longitudinal axis 223 of the needle 103 to verify that the needle is not below the surface of the scrum (e.g., disposed within the S1 PSFA 1211). Additionally, an electrical signal may be applied to the needle 103 to stimulate nerves proximate to the tip 201 to verify correct needle 103 placement.

[0158] The process may include rotating the needle 103 such that the midpoint 502 is oriented toward the first target volume 1203a in the direction of arrow 1205a. Next, the filaments 206a, 206b may be advanced to the deployed position. The position of the needle 103 and deployed filaments 206a, 206b may be verified using fluoroscopy and/or stimulation. The RF probe 401 may then be inserted into the lumen 222 such that RF energy emanating from the needle 103 will be conducted by the tip 201 and filaments 206a, 206b to the first target volume 1203a. Next, RF energy may be applied to the RF probe 401. The RF energy emanating from the needle 103 may be preferentially biased toward the first target volume 1203a. The lesion created by such an application of RF energy may, for example, have a maximum cross dimension of 8-10 mm, and may ablate a corresponding portion of the rami 1201.

[0159] Next, the filaments 206a, 206b may be retracted and the needle 103 may be rotated approximately 180 degrees such that the midpoint 502 is oriented toward the second target volume 1203b in the direction of arrow 1205b. Optionally, some lateral repositioning of the needle may performed (e.g. without any needle pull back or with a small amount of needle pull back and reinsertion). Next, the filaments 206a, 206b may be advanced to the deployed position. The position of the needle 103 and deployed filaments 206a, 206b

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may be verified using fluoroscopy and/or stimulation. Next, RF energy may be applied to the RF probe 401 to create a lesion corresponding to the second target volume 1203b.

[0160] In this regard, with a single insertion of the needle 103, two interconnected lesions (which may also be considered to be a single oblong lesion) may be created. Thus, as compared to known methods where an RF probe must be repositioned prior to each application of RF energy, the number of probe repositioning steps may be greatly reduced, thus reducing patient trauma and procedure duration. In this regard, a continuous region of lesioning may be achieved disposed about the S1 PSFA 1211 such that the lesion occupies a volume surrounding the S1 PSFA 1211 from about the 2:30 clock position to about the 5:30 clock position (as viewed in FIG. 13). Such lesioning may help to achieve denervation of the posterior rami proximate to the S1 PSFA 1211.

[0161] The above procedure may be repeated as appropriate to create lesions corresponding to the entire series of target volumes 1203a-1203h, thus denervating the SIJ. In this regard, a similar continuous region of lesioning may be achieved disposed about the S2 PSFA 1212 and a region of lesioning from about the 12:00 clock position to about the 3:00 clock position (as viewed in FIG. 13) relative to the S3 PSFA may be achieved disposed about the S3 PSFA 1213. Furthermore, a lesion 1208 may be created at the base of the superior articular process of the L5 1209 dorsal ramus in the grove between the superior articular process and the body of the sacrum. The needle 103 may be inserted generally perpendicular to the plane of FIG. 13 to produce lesion 1208.

[0162] In a variation of the above procedure, three or more lesions may be created with a needle in a single position. For example, a needle positioned at a point 1106 proximate to three target volumes 1203c, 1203d, and 1203e, may be operable to create lesions at each of the three target volumes 1203c, 1203d, and 1203e, thus further reducing the number of needle repositionings.

[0163] In another variation, each individual lesion corresponding to the series of target volumes 1203 may be created using a needle with deployable filaments where the needle is repositioned prior to each application of RF energy. In such a variation the sequence of steps may be insert needle, deploy filaments, apply RF energy, retract filaments, reposition needle, and repeat as appropriate to create each desired lesion. Such a procedure may be

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conducted using a needle capable of producing a lesion symmetric to a central longitudinal axis of the needle (e.g., the needle of FIG. 9).

[0164] 3. Thoracic RF Neurotomy of a Medial Branch Nerve.

[0165] This process may include using a needle that enables the creation of lesions which are offset from the central longitudinal axis of the needle. Successful treatment of thoracic z-joint pain using radiofrequency ablation of relevant medial branch nerves is challenging owing to the inconsistent medial branch location in the intertransverse space, especially levels T5-T8. A conventional RF cannula must be positioned at multiple locations within the intertransverse space to achieve the sufficient tissue ablation for successful medial branch neurotomy. The procedure will be described as being performed on an intertransverse space between adjacent ones 1301, 1302 of the T5 to T8 thoracic vertebrae using FIG. 14 and the needle 103 of FIGS. 2A-6. It should be understood that other embodiments of needles described herein may be used in the procedure.

[0166] The process may include obtaining an optimized segmental anteroposterior image at target level defined by meticulous counting from T1 and T12. This may be followed by obtaining an image that is ipsalateral oblique 8-15 degrees off sagittal plane of the spine to visualize costotransverse joint lucency clearly. This allows improved visualization of superior-lateral transverse process (especially in osteopenic patients). This angle aids in directing the probe to a thoracic anatomic safe zone medial to the lung, minimizing risk of pneumothorax.

[0167] The skin entry site for the needle 103 may be over the most inferior aspect of transverse process slightly medial to costotransverse joint. Inserting the needle 103 may include navigating the device over transverse process over bone to touch superior transverse process slightly medial to costotransverse joint. The process may include checking anteroposterior imaging to demonstrate active tip 201 of the needle 103 is at the superolateral corner of the transverse process. The process may also include checking a contralateral oblique (e.g., +/-15 degrees) image view to demonstrate the target transverse process in an elongate fashion. This view is useful for demonstrating the tip 201 of the needle 103 in relationship to the superolateral margin of the transverse process subadjacent to the targeted

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medial branch nerve. The process may include retracting the active tip 201 slightly (e.g., 1 mm to 3 mm).

[0168] The process may include rotating the needle 103 such that the midpoint 502 is oriented toward the intertransverse space between the vertebrae 1301, 1302 and the medial branch nerve 1303 that is positioned therein. Next, the filaments 206a, 206b may be advanced ventral into the intertransverse space between the vertebrae 1301, 1302 to the deployed position. The position of the needle 103 and deployed filaments 206a, 206b may be verified using fluoroscopy (e.g., using lateral imaging). The RF probe 401 may then be inserted into the lumen 222 such that RF energy emanating from the probe 103 will be conducted by the tip 201 and filaments 206a, 206b to the target medial branch nerve 1303. Stimulation (e.g., motor and/or sensory) may be performed to verify positioning. Next, RF energy may be applied to the RF probe 401. The RF energy emanating from the needle 103 may be preferentially biased toward the volume between the vertebrae 1301, 1302. The lesion created by such a procedure may, for example, have a maximum cross dimension of 8-10 mm, and may ablate a corresponding portion of the medial branch nerve 1303.

[0169] It is noted that thoracic RF neurotomy performed on other thoracic vertebrae may require different sized lesions. For example, thoracic RF neurotomy performed on the T3-T4 vertebrae may require a smaller lesion volume than the above-described procedure, and thoracic RF neurotomy performed on the T1-T2 vertebrae may require a still smaller lesion volume. As described herein, the deployment of the filaments of the needle 103 may be varied to achieve such desired target lesion volumes.

[0170] 4. Cervical Medial Branch RF Neurotomy.

[0171] Embodiments of needles described herein (e.g., the needle 103 of FIG. 2A) are capable of creating a volume of tissue ablation necessary for complete denervation of the cervical zygapophyseal joints, including the C2/3 cervical zygapophyseal joint (z-joint). Tissue ablation for cervical z-joint using embodiments of needles described herein may be accomplished using a single placement and single heating cycle. Such single placement and single heating cycle may avoid unnecessary tissue damage from multiple placements of a conventional probe, and unintended injury to collateral tissue caused by excessive lesioning. The zone of ablation created by various embodiments of the device is designed to provide

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sufficient, and necessary tissue coagulation for a successful procedure, and thus may be expected to improve the outcomes of patients undergoing this spinal radiofrequency neurotomy.

[0172] A cervical medial branch RF neurotomy procedure will be described as being performed on the third occipital nerve at the C2/3 z-joint using the needle 103 as shown in FIG. 15. In FIG. 15, the needle 103 is positioned between the C2 1401 and C3 1402 vertebrae.

[0173] In a first step, the patient may be placed in a prone position on a radiolucent table suited to performing fluoroscopically guided spinal procedures. Sedation may be administered. The patient's head may be rotated away from the targeted side. Sterile skin prep and draping may be performed using standard well-described surgical techniques.

[0174] For Third Occipital Nerve (TON) ablation (C2/3 joint innervation) the lateral aspect of the C2/3 Z-joint is located under either parasagittal or alternatively, ipsilateral oblique rotation of less than/equal to 30 degrees of obliquity relative to the true sagittal plane of the cervical spine. The skin entry point may be infiltrated with local anesthetic. Then the tip 201 of the needle 103 is moved over the most lateral aspect of bone of the articular pillar at the juncture of the C2/3 z-joint to a first position contacting bone proximate to the most posterior and lateral aspect of the z-joint complex

[0175] Once boney contact is made, the needle 103 may be retracted a predetermined distance (e.g., 1-3 mm) and the filaments are deployed towards the lateral aspect of the C2/3 z-joint. The needle 103 may be rotated about a central longitudinal axis prior to filament deployment to ensure that deployment will occur in the desired direction.

[0176] Multiplanar fluoroscopic imaging may then be employed to verify that the tip and filaments are positioned as desired. For example, it may be verified that the filaments are positioned straddling the lateral joint lucency, and posterior to the C2/3 neural foramen. Useful imaging angles include anterior-posterior (AP), lateral, and contralateral oblique (Sluijter) views. To further verify adequate positioning of the needle 103, motor stimulation may be performed by delivering a voltage (of up to 2 volts) at 2 Hz to the tip 201 and filaments. Furthermore, sensory stimulation may be performed at appropriate voltage (e.g., 0.4 to 1 volt) and frequency (e.g., 50 Hz).

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[0177] After position verification, RF energy may be applied to the tip and the plurality of filaments to generate heat that ablates a portion of the third occipital nerve. After lesioning, the device may be removed. For levels below the C2/3 z-joint, the procedure may be similar than as described above with respect to the third occipital nerve, with the exception that the initial boney contact target is at the waist of inflection point of the articular pillar.

[0178] Similar to the above procedures, other spinal RF procedures may benefit from the asymmetrical application of RF energy from embodiments of probes described herein. Such asymmetry may, for example, be used to project RF energy in a desired direction and/or limit the projection of RF energy in undesired directions. The configuration of the filaments may be selected for a particular application to produce a desired size, shape and location (relative to the needle tip) of a lesion within the patient. The location of the lesion may be offset distally and/or laterally from the tip of the needle as required for a particular application.

[0179] It will be appreciated that the delivery of RF energy to tissue in the anatomy is practiced for a multitude of reasons and embodiments of needles described herein may be adapted (modified or scaled) for use in other medical procedures. For example, embodiments of needles described herein could be used to deliver RF energy as a means to cauterize "feeder vessels," such as in bleeding ulcers and/or in orthopedic applications. Further, embodiments of needles described herein could also be adapted to procedures such as cardiac ablation, in which cardiac tissue is destroyed in an effort to restore a normal electrical rhythm in the hart. This application could further benefit from the ability of embodiments of needles described herein to deliver fluid through a lumen since, for example, emerging procedures in cardiac therapy require the ability to deliver stem cells, vascular endothelial growth factor (VEGF), or other growth factors to cardiac tissue. The ability to steer embodiments of the needle (previously discussed) may provide significant benefit to the in the field of cardiovascular drug delivery.

[0180] While various embodiments of the present invention have been described in detail, it is apparent that further modifications and adaptations of the invention will occur to those skilled in the art. However, it is to be expressly understood that such modifications and adaptations are within the spirit and scope of the present invention.

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WHAT IS CLAIMED IS:

1. A needle for insertion into a patient during an RF ablation procedure, the needle comprising:

a hub;

an elongate member fixed to the hub;

a tip fixed to the elongate member at a distal end of the needle, wherein the tip is shaped to pierce tissue of the patient;

a plurality of filaments disposed within at least a portion of the elongate member;

an actuator interconnected to the plurality of filaments, wherein movement of the actuator relative to the hub moves the plurality relative to the tip; and

a lumen within the elongate member, wherein the lumen and the tip are configured to accept an RF probe such that an electrode of an inserted RF probe, the tip, and the first and second filaments are operable to form a single monopolar RF electrode.

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Avanos v. Stratus
Page 73 of 385

ABSTRACT

Methods and systems for spinal radio frequency neurotomy. Systems include needles capable of applying RF energy to target volumes within a patient. Such target volumes may contain target medial branch nerves along vertebrae or rami proximate the sacrum. Such procedures may be used to ablate or cauterize a portion of the targeted nerve, thus blocking the ability of the nerve to transmit signals to the central nervous system. Disclosed needles may be operable to asymmetrically, relative to a central longitudinal axis of the needle, apply RF energy. Such asymmetry facilitates procedures where a tip of the needle is placed proximate to anatomical structures for location verification. Then RF energy may be applied in a selectable direction relative to the needle tip to ablate volumes that include the targeted medial branch nerves or rami, thus denervating facet joints or the sacroiliac joint, respectively, to relieve pain in a patient.

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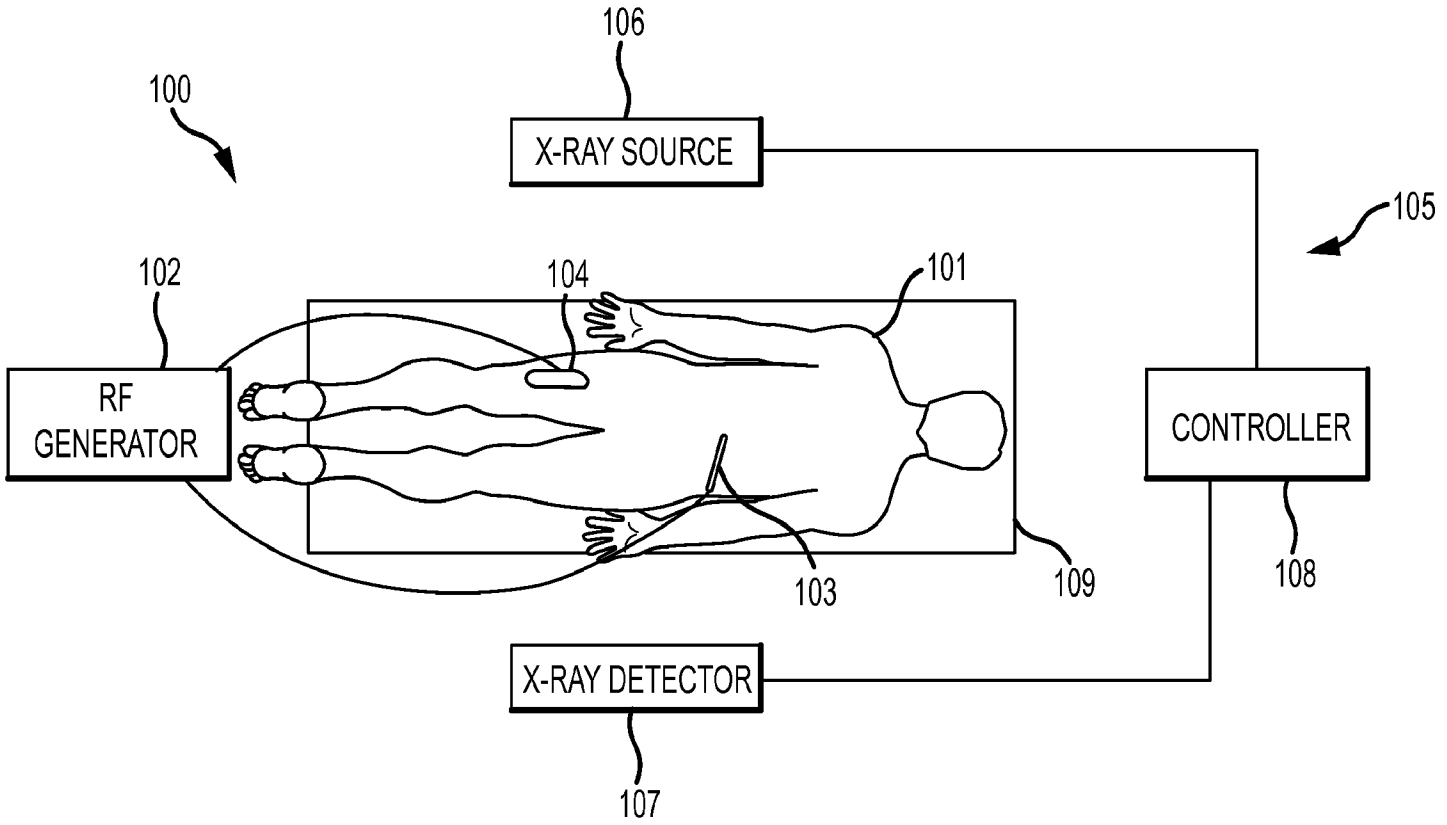


FIG.1

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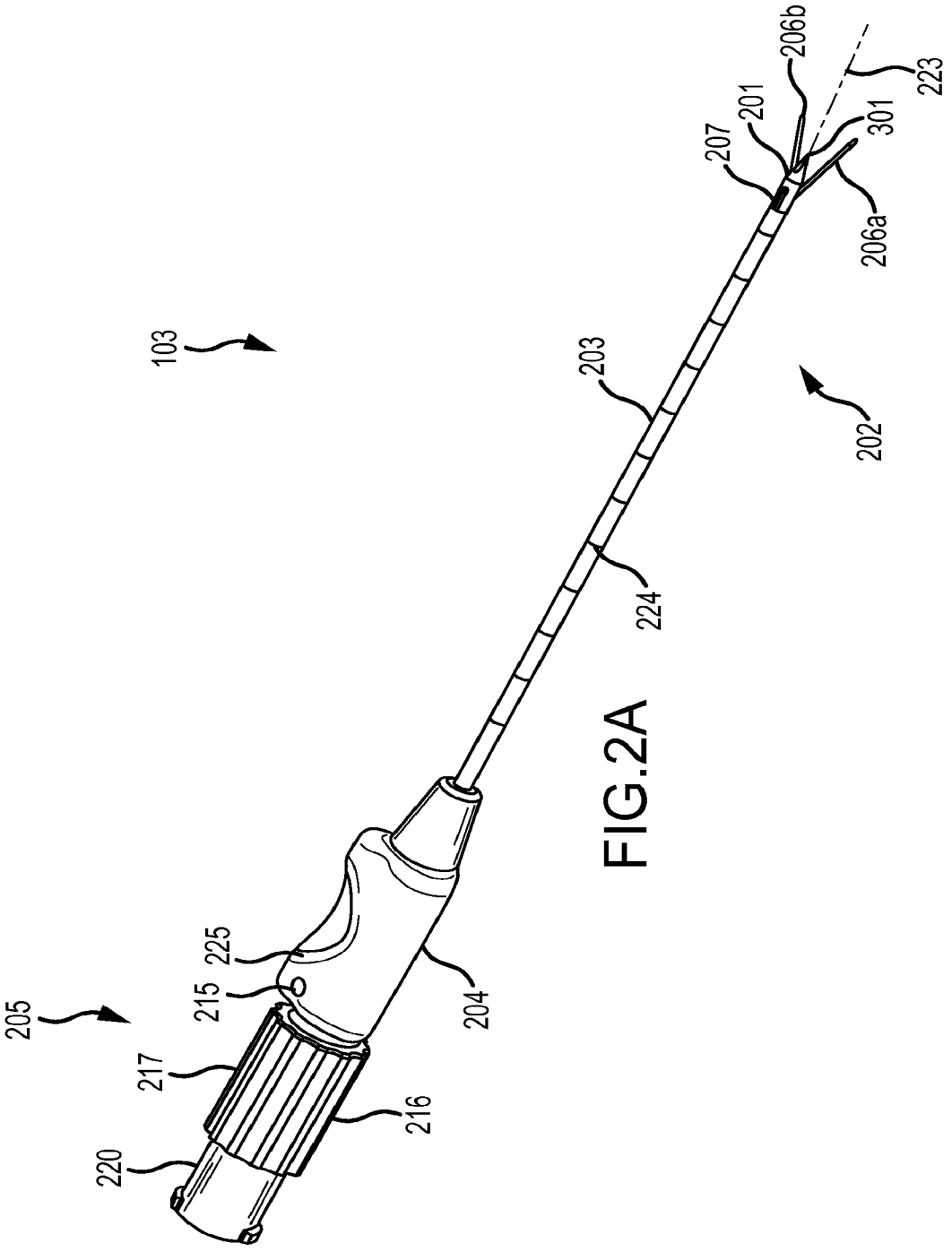

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FIG.2A

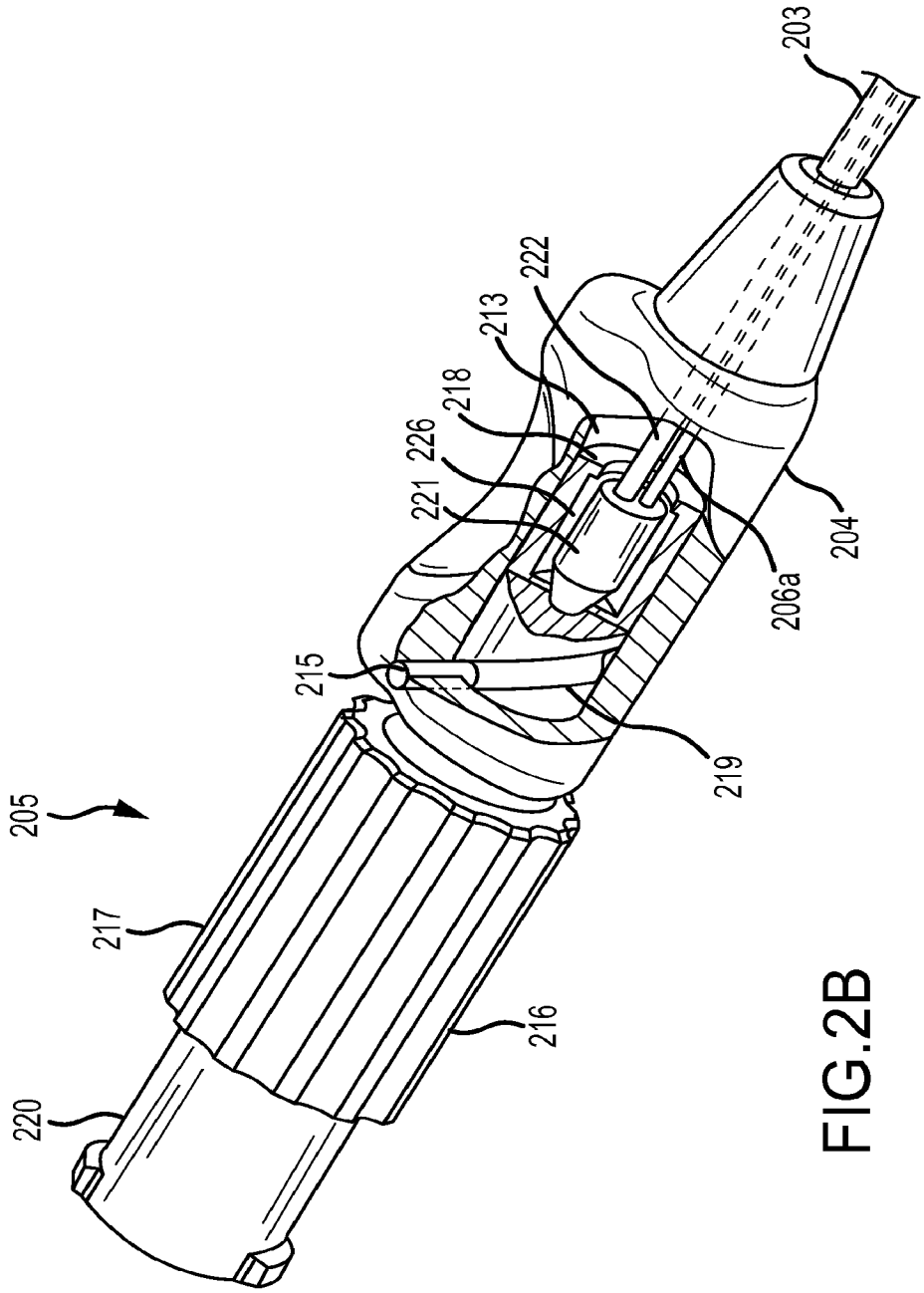


FIG.2B

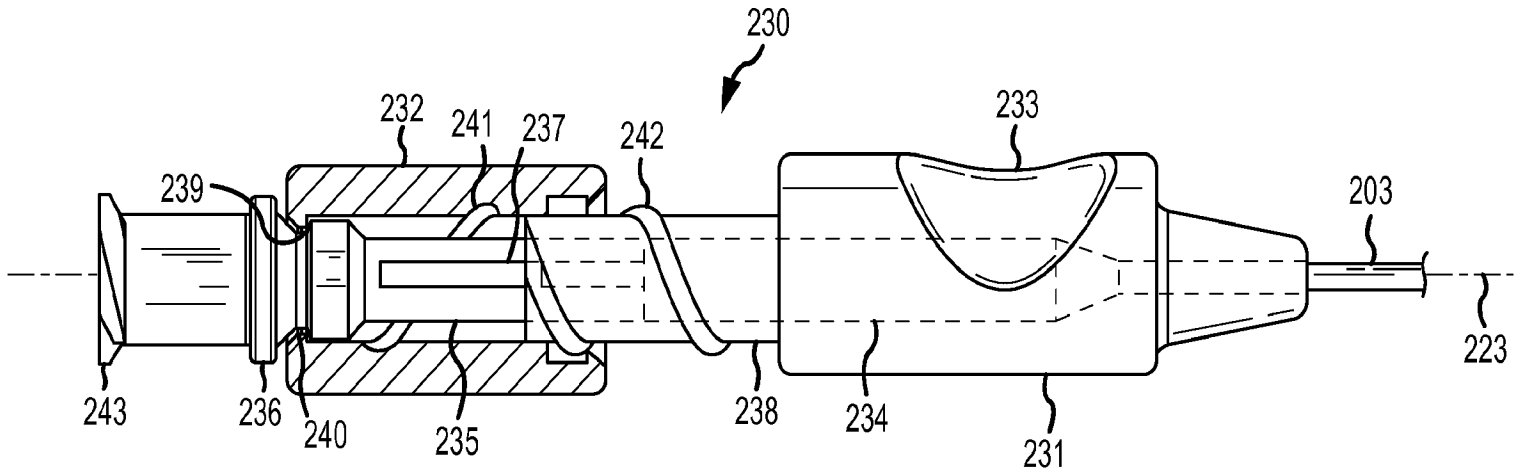


FIG.2C

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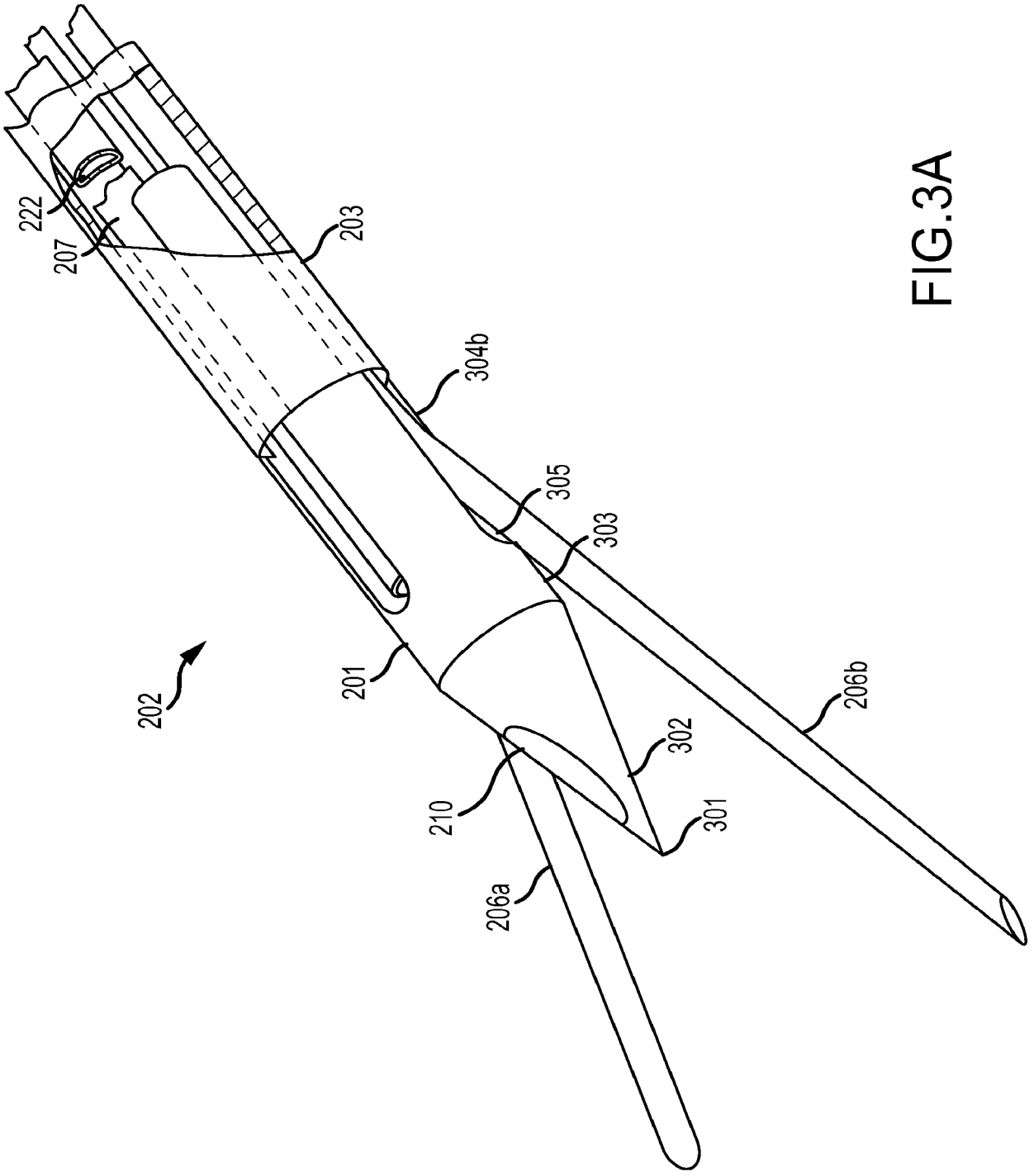


FIG.3A

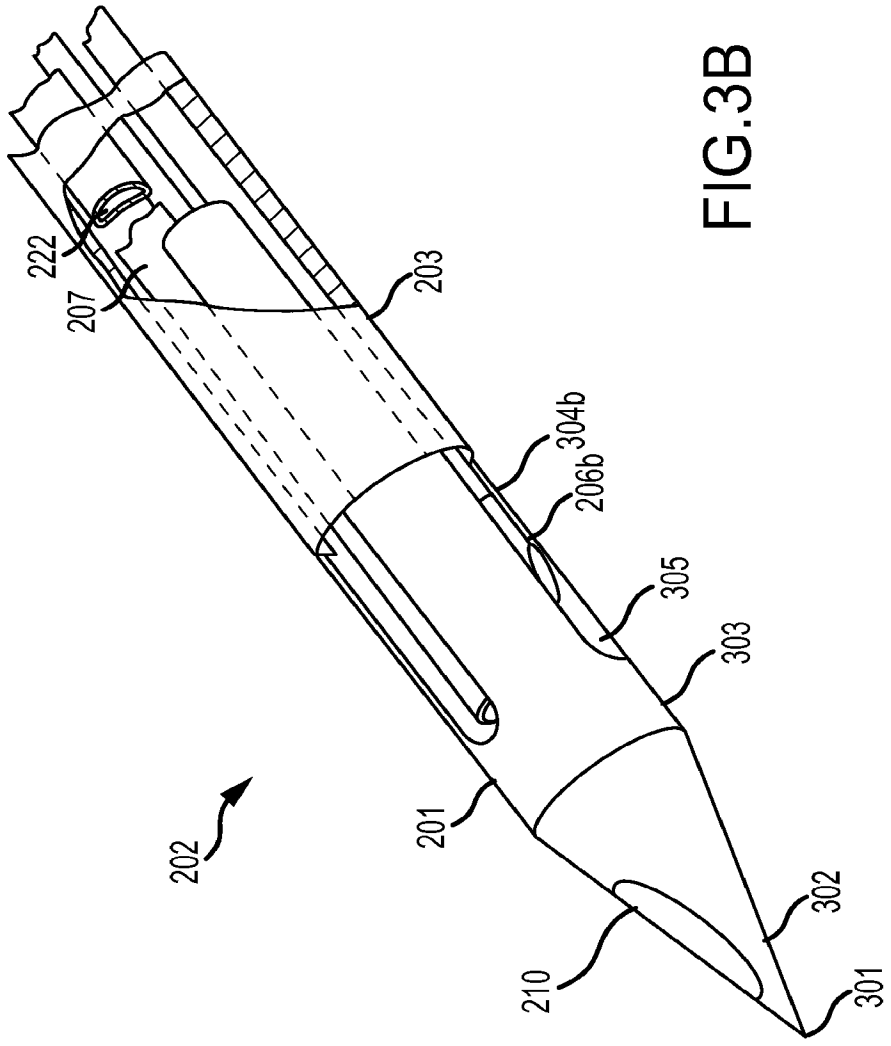


FIG.3B

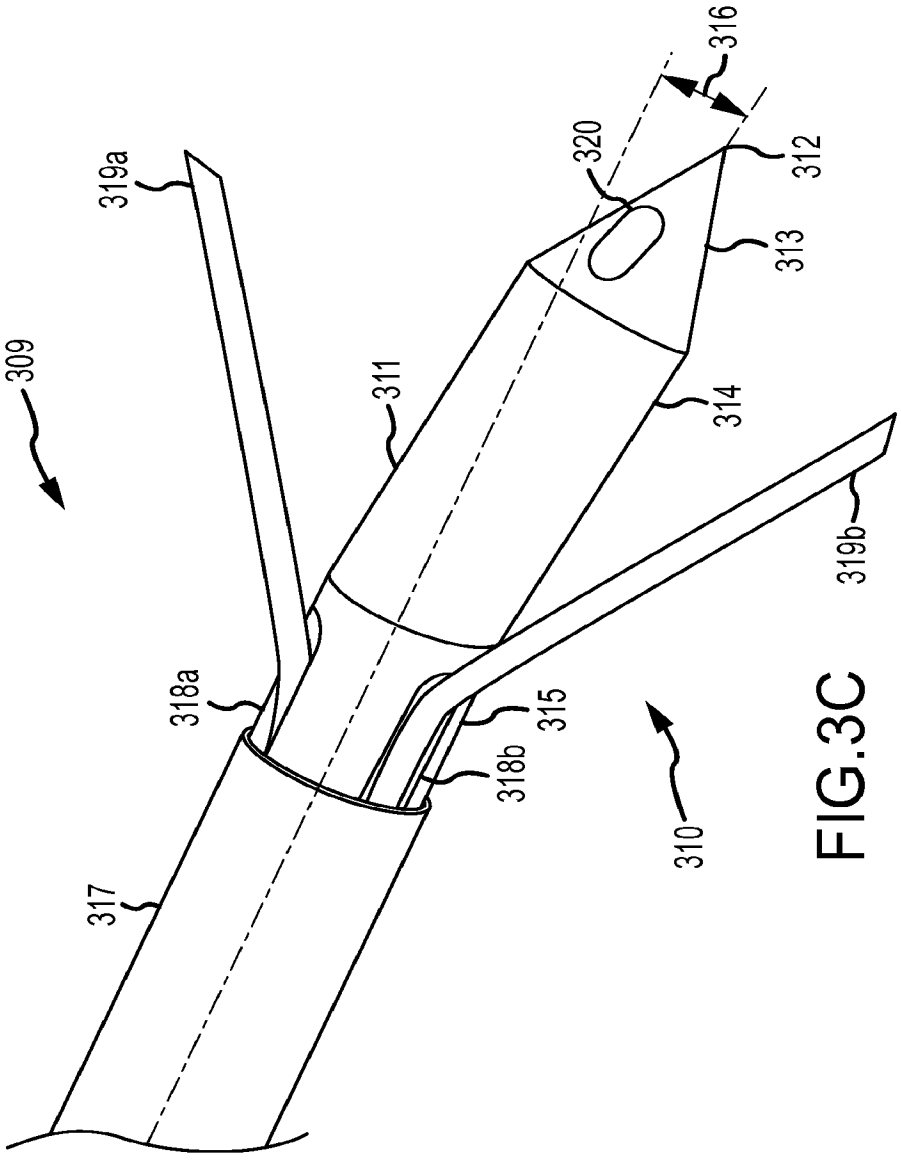


FIG.3C

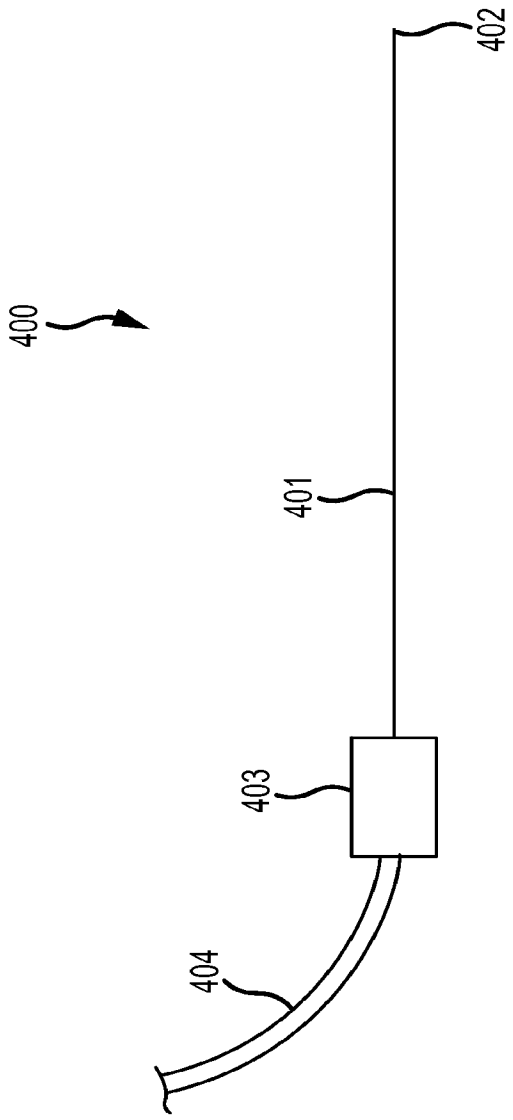


FIG.4

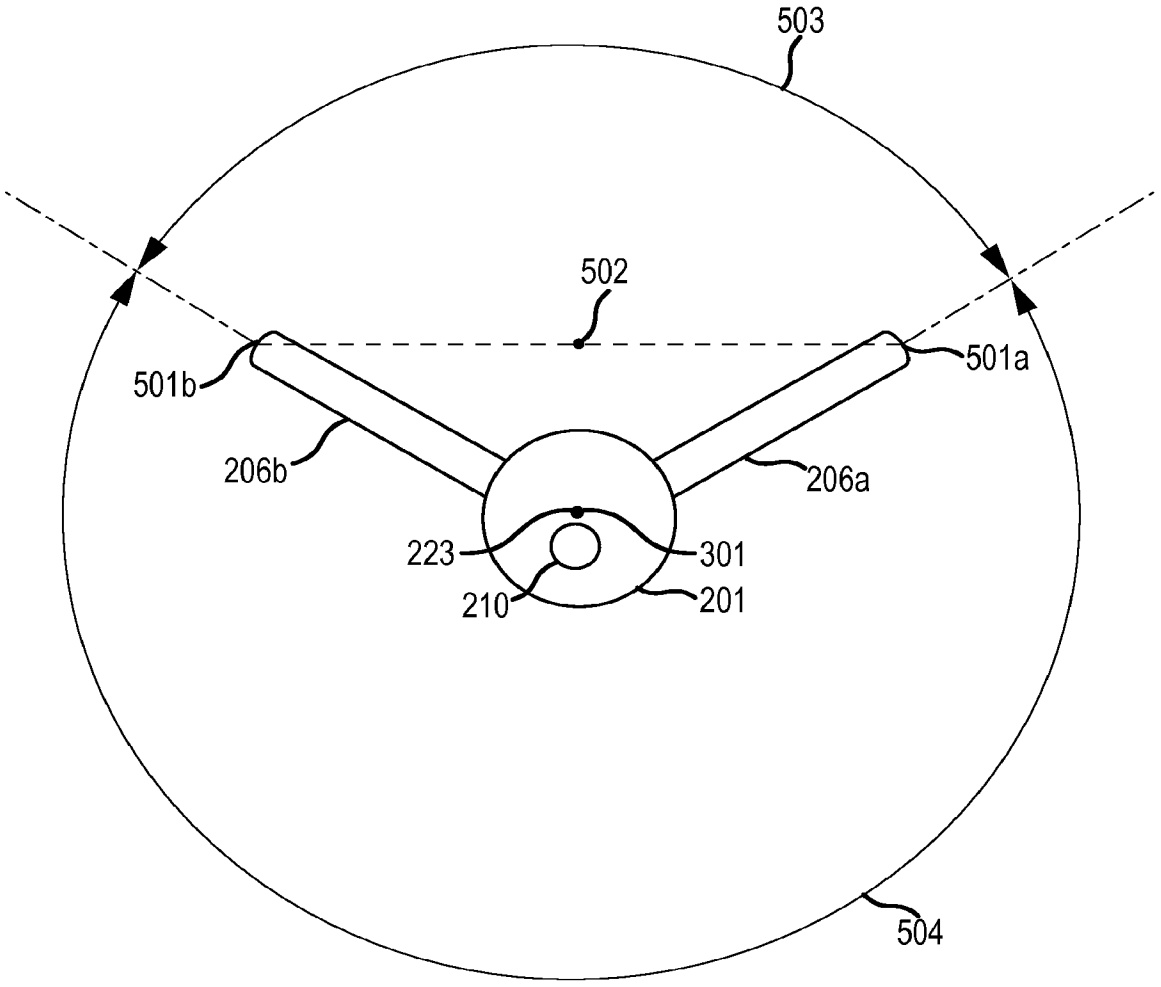


FIG.5

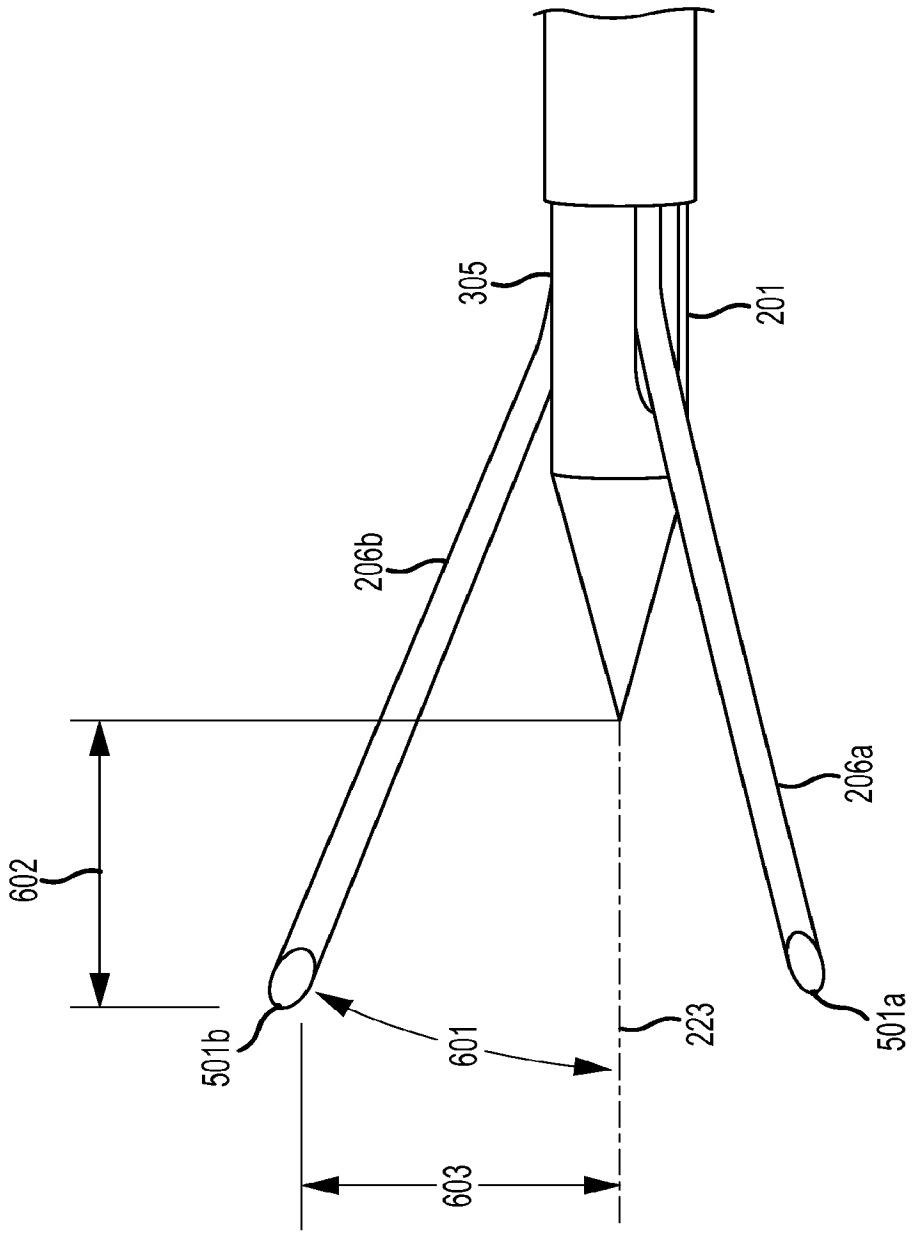


FIG.6

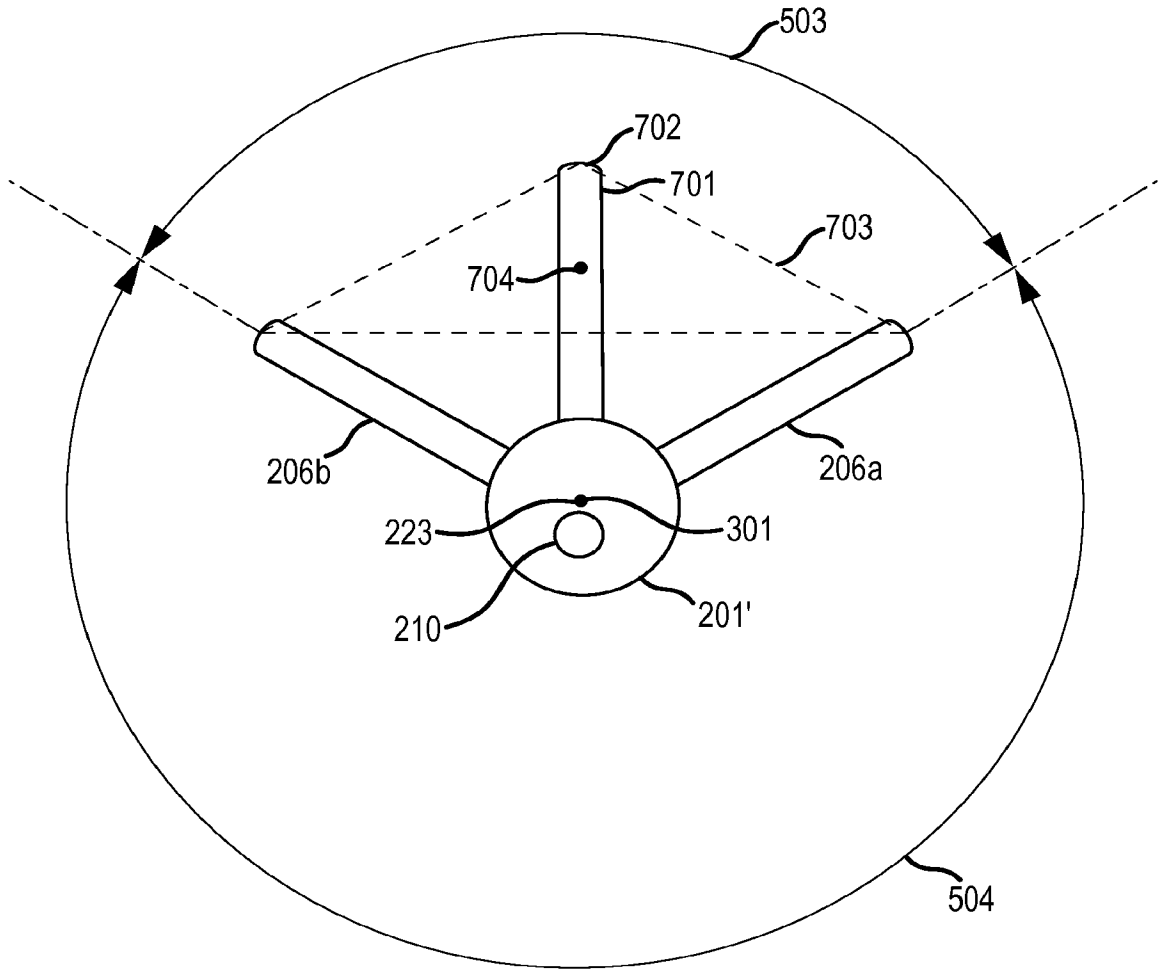


FIG.7

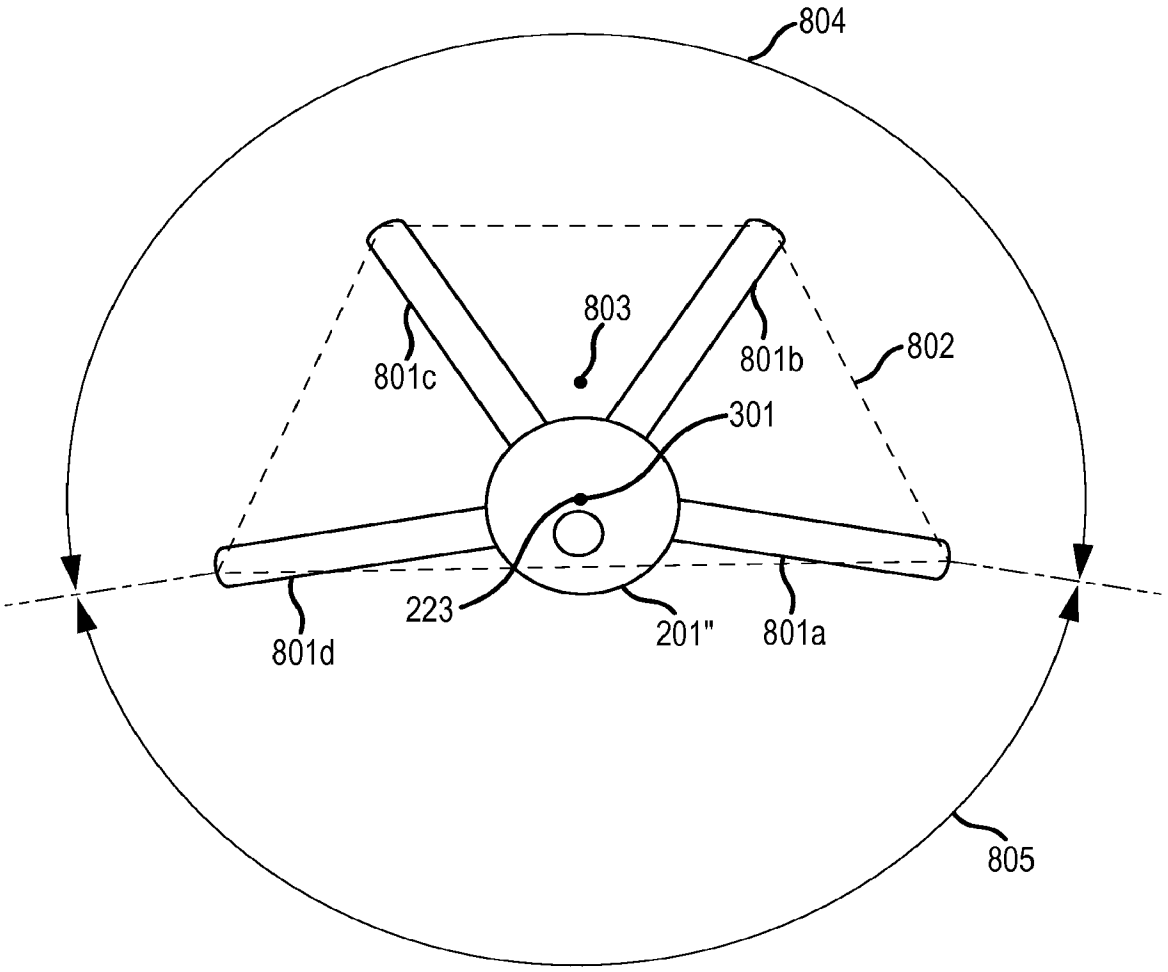


FIG.8

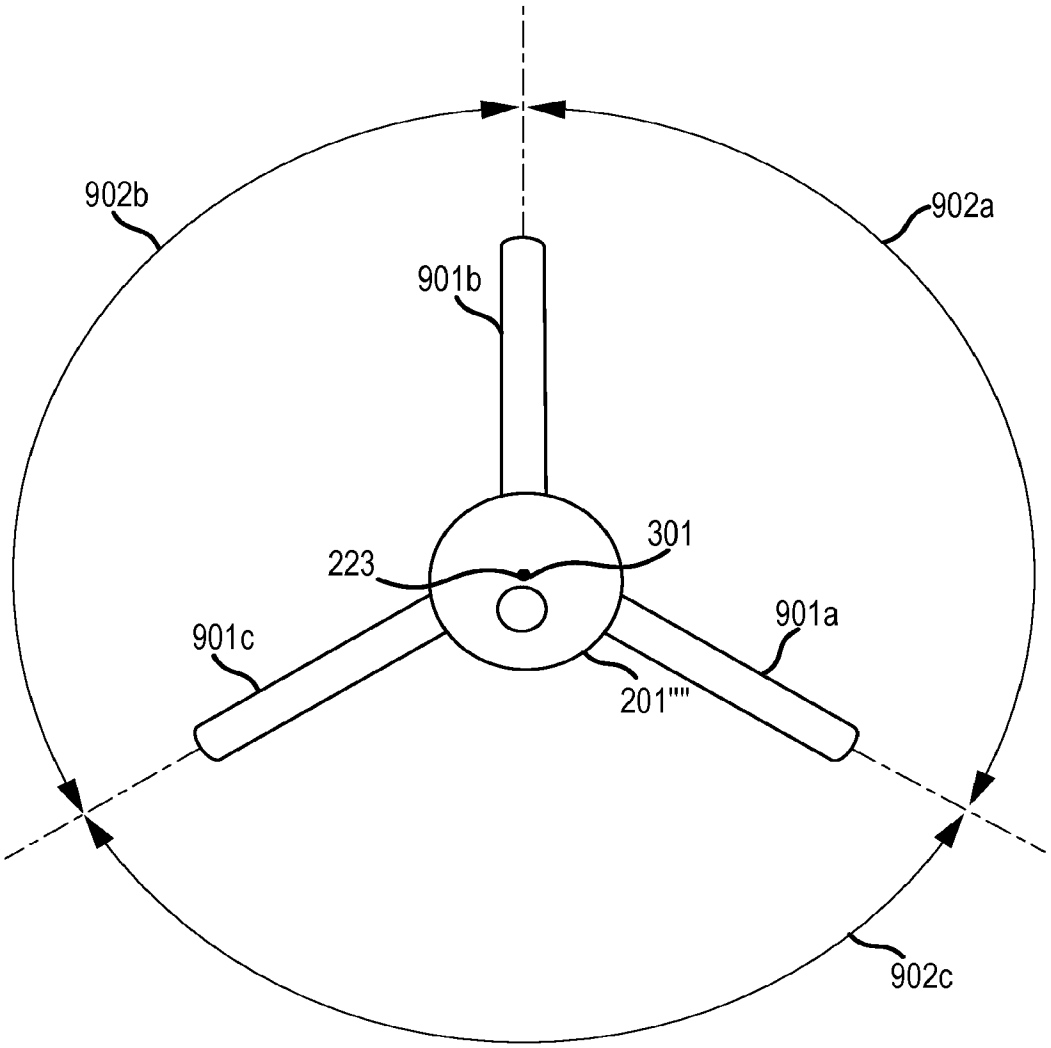


FIG.9

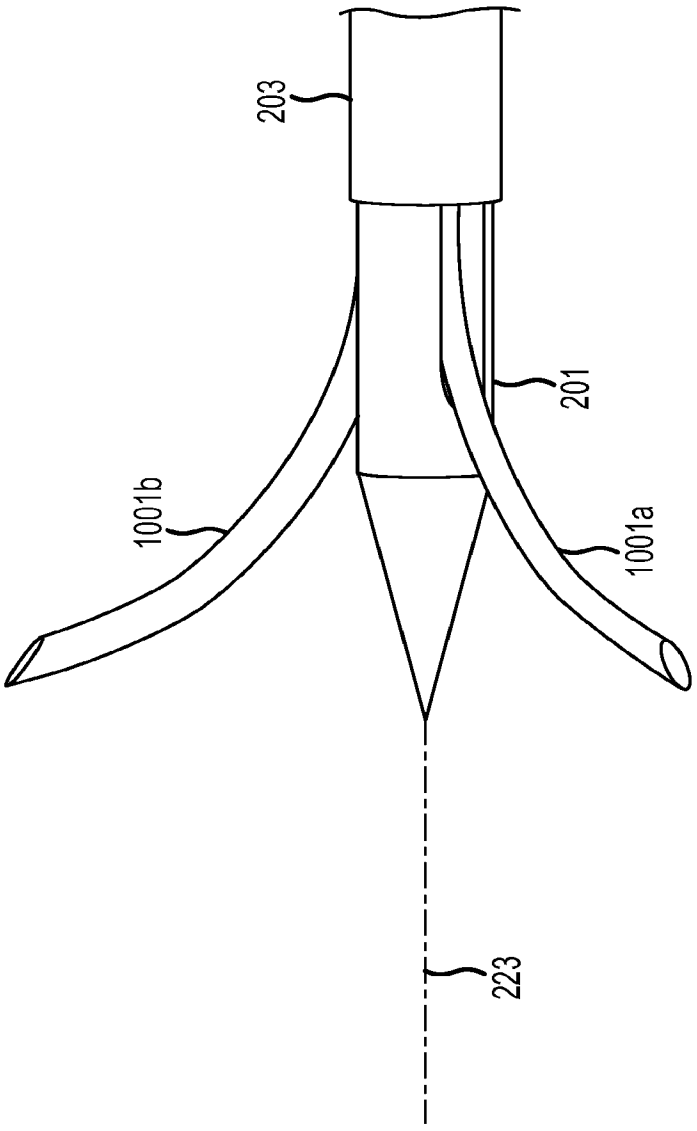


FIG.10

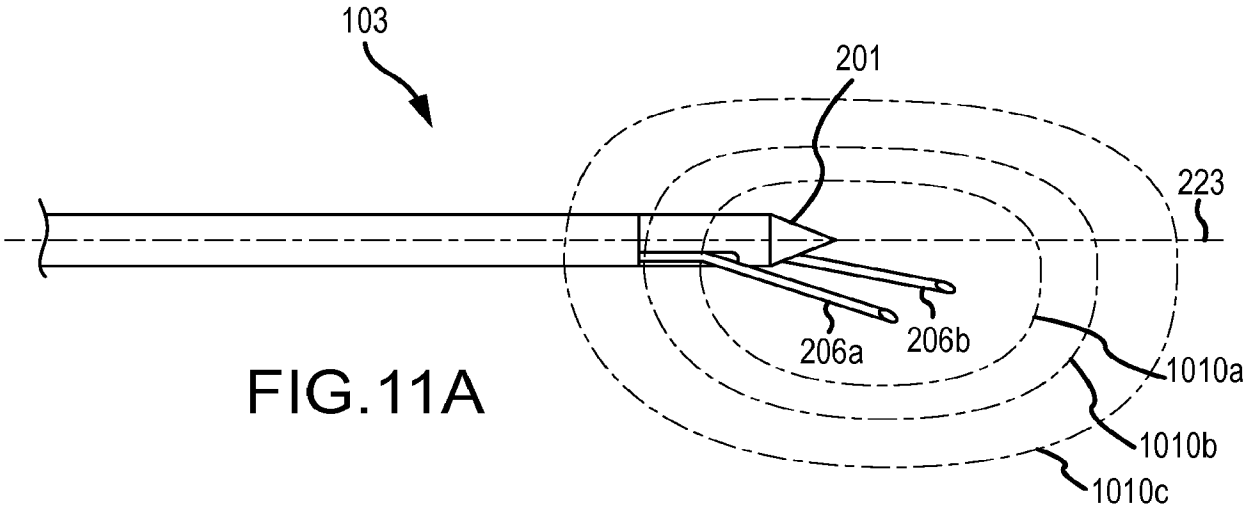


FIG.11A

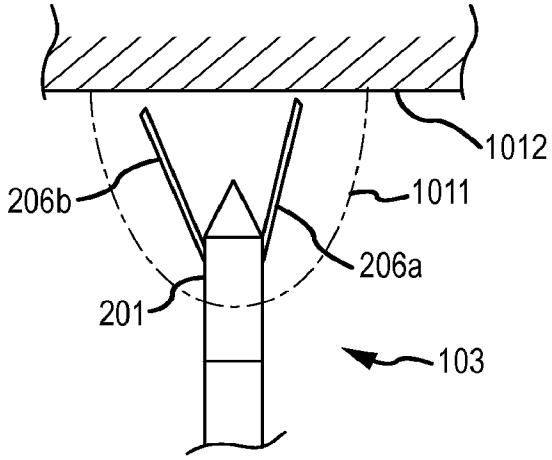


FIG.11B

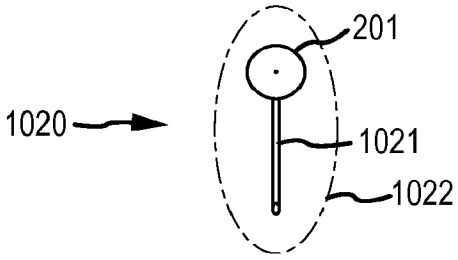


FIG.11C

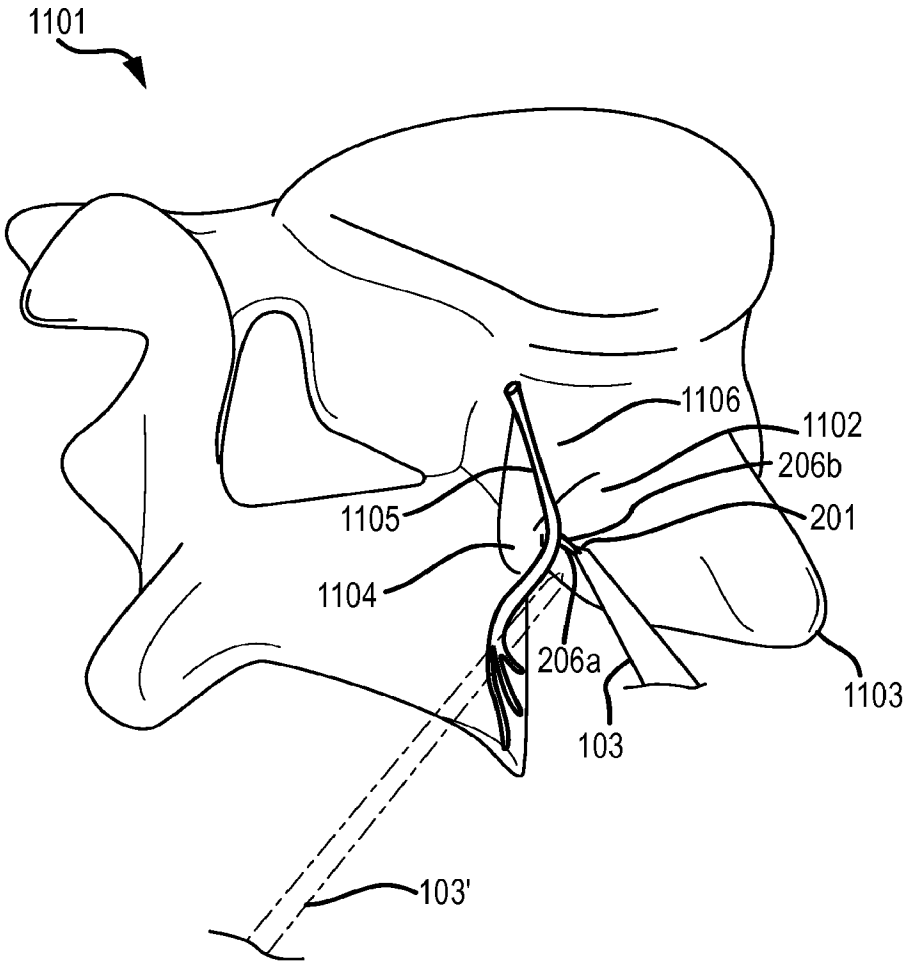


FIG.12

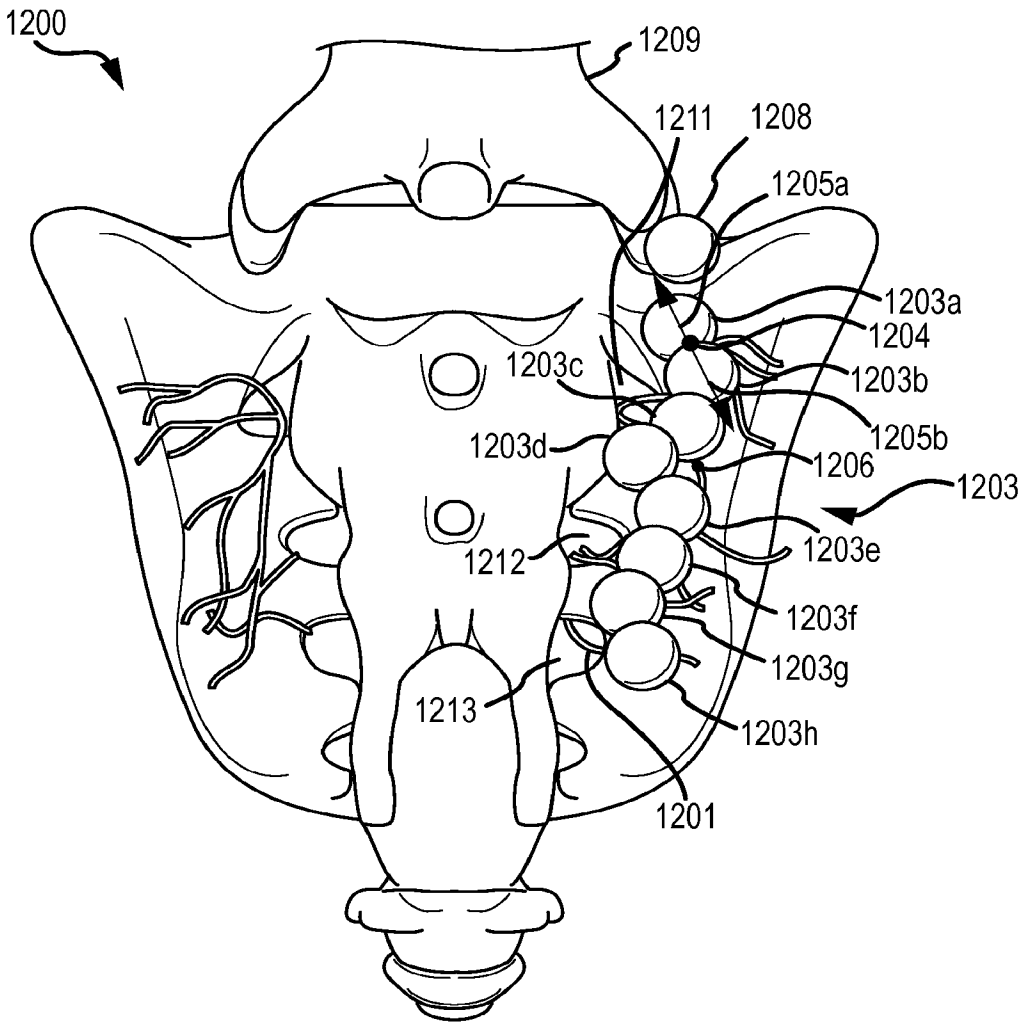

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FIG.13

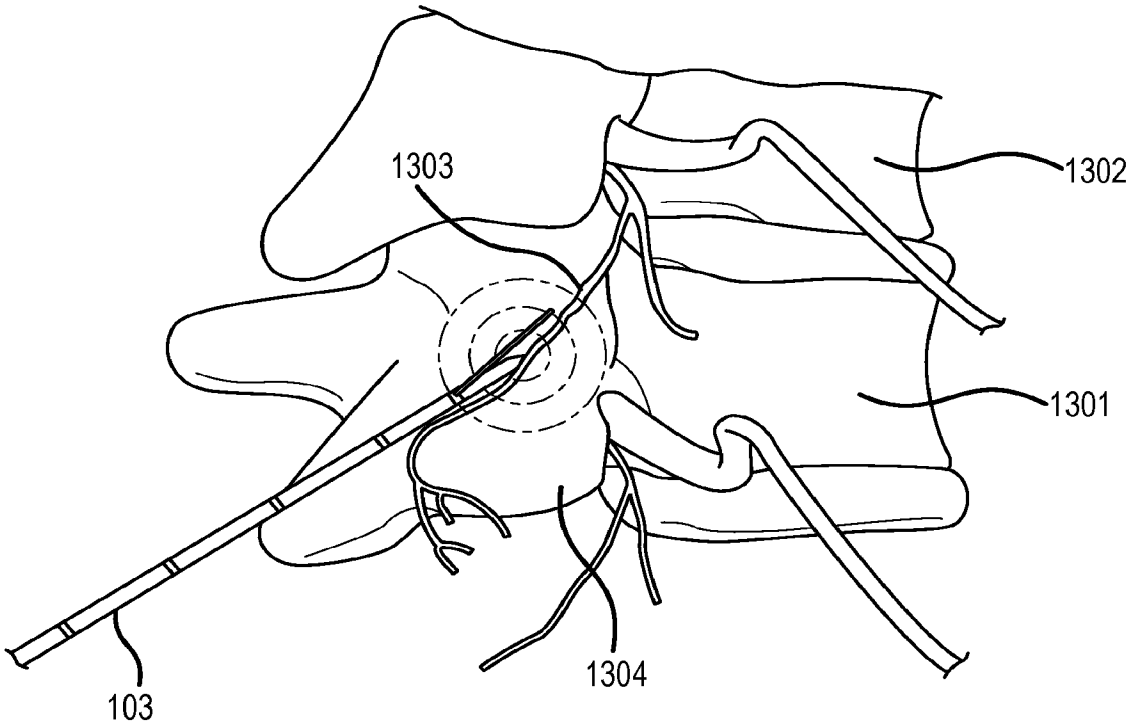


FIG.14

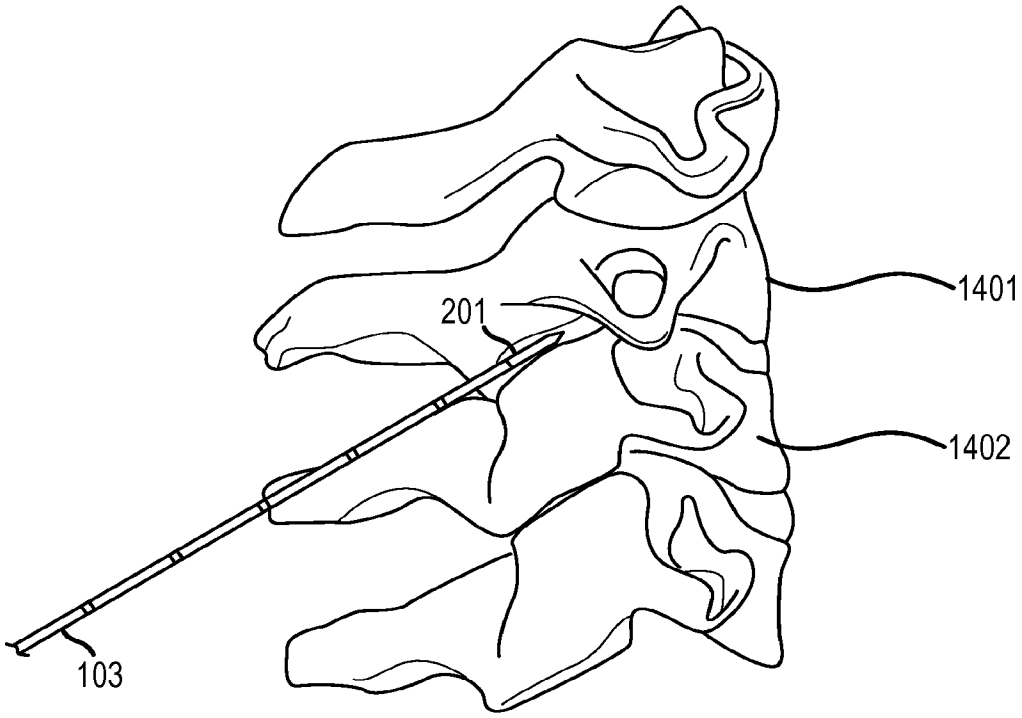


FIG.15

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/933,995

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	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		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 230 =	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	785		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.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/933,995	07/20/2020		785	NBUS.001C1C1	1	1

CONFIRMATION NO. 4367

148468
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

FILING RECEIPT

OC000000118859143

Date Mailed: 07/31/2020

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

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

Inventor(s)

Robert E. Wright, Clayton, AUSTRALIA;
Scott A. Brandt, Denver, CO;

Applicant(s)

Stratus Medical, LLC, Salt Lake City, UT;

Assignment For Published Patent Application

Stratus Medical, LLC, Salt Lake City, UT

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/098,673 04/14/2016 PAT 10736688
which is a CON of 12/940,974 11/05/2010 ABN
which claims benefit of 61/347,351 05/21/2010
and claims benefit of 61/280,557 11/05/2009

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

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Avanos v. Stratus
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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: 07/30/2020
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/933,995**
Projected Publication Date: 11/05/2020
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

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

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

148468 7590 08/24/2020

Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

EXAMINER	

ART UNIT	PAPER NUMBER
3794	

NOTIFICATION DATE	DELIVERY MODE
08/24/2020	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):

dhiggs@biomerics.com
dhiggs@medventureholdings.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/933,995	**Applicant(s)** Wright et al.	
	Examiner TERRI S JOHNSON	**Art Unit** OPET	**AIA (FITF) Status** No

1. THE REQUEST FILED 20 July 2020 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to TERRI JOHNSON at (571)272 -2991. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/TERRI S JOHNSON/ Paralegal Specialist, OPET	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	16/933,995
First Inventor	:	Robert E. Wright et al.
Title	:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
Filed	:	July 20, 2020
Examiner	:	Eun Hwa Kim
Customer No.	:	148468

Mail Stop Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Commissioner:

Prior to examination of the above-identified application, which is being filed concurrently herewith, the Applicant respectfully requests entry of the following amendments:

Amendments to the Specification begin on page 2.

Amendments to the Claims are reflected in the Listing of Claims that begins on page 3.

Remarks begin on page 9.

Electronic Patent Application Fee Transmittal

Application Number:	16933995
Filing Date:	20-Jul-2020
Title of Invention:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Filer:	Daniel Christopher Higgs
Attorney Docket Number:	NBUS.001C1C1

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:				
CLAIMS IN EXCESS OF 20	2202	10	50	500
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**500**

Electronic Acknowledgement Receipt

EFS ID:	40448590
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	02-SEP-2020
Filing Date:	20-JUL-2020
Time Stamp:	02:00:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$500
RAM confirmation Number	E202092301063232
Deposit Account	602176
Authorized User	Daniel Higgs

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 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		NBUS001C1C1_Second_Preliminary_Amendment.pdf	113023 7a9ec06bf00cfe46cd6f11caa2f4ace657a207da	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	9	9
	Claims	3	8
	Specification	2	2
	Preliminary Amendment	1	1

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30506 aa2c71520974e25ee0792a6f92e332c1954f7919	no	2

Warnings:

Information:

Total Files Size (in bytes):	143529

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.

Remarks

By this paper, amendments to the title of the Application are presented, claim 2 is cancelled without prejudice or disclaimer, and new claims 3 through 32 are added, of which claims 3 and 24 are independent. Accordingly, upon entry of this paper, the application will contain two (2) independent claims and 30 total claims. The Applicant thus respectfully submits that the present application will remain entitled to its Track One Prioritized Examination status.

The Applicant respectfully requests examination of the Application as amended herein. The Examiner is invited to contact the undersigned attorney should there be any impediment to the prompt allowance of this Application that is susceptible to being addressed by a telephonic interview or overcome by an examiner's amendment.

DATED this 2nd day of September, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
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Attorney for Applicant

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Amendments to the Claims

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

1. (Cancelled)

2. (Cancelled)

3. (New) A method comprising:

inserting a needle into a patient, the needle comprising:

an elongate member;

a piercing tip at a distal end of the elongate member;

a lumen within the elongate member; and

a filament in a retracted position in which the filament is at least partially disposed within the elongate member;

moving the filament to a deployed position within the patient in which at least a distal end of the filament is out of the elongate member and disposed away from the tip;

inserting a radiofrequency probe into the lumen of the needle such that the radiofrequency probe contacts a conductive portion of the needle at a distal end of the needle to thereby establish an electrically conductive path from the radiofrequency probe to the filament; and

operating the radiofrequency probe, the tip, and the filament as a monopolar electrode, with radiofrequency energy from the radiofrequency probe being conducted to the filament through the electrically conductive path and transmitted by the filament.

4. (New) The method of claim 3, wherein said moving the filament to a deployed position within the patient takes place prior to said inserting the radiofrequency probe into the lumen of the needle.

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5. (New) The method of claim 3, wherein the needle further comprises a fitting in fluid communication with the lumen, the method further comprising:

connecting a fluid source to the fitting;

transporting fluid through the lumen of the needle to a target volume within the patient; and

disconnecting the fluid source from the fitting.

6. (New) The method of claim 5, wherein said inserting the radiofrequency probe into the lumen is achieved by passing the radiofrequency probe through the fitting.

7. (New) The method of claim 5, wherein said inserting the radiofrequency probe into the lumen takes place after said disconnecting the fluid source from the fitting.

8. (New) The method of claim 3, wherein said moving the filament to the deployed position comprises positioning the distal end of the filament distally beyond the tip of the needle.

9. (New) The method of claim 3, wherein said moving the filament to the deployed position places the distal end of the filament at a position that is spaced from a central longitudinal axis of the needle by a distance greater than a radius of the elongate member.

10. (New) The method of claim 3, further comprising attaching a return electrode pad to the patient prior to said operating the radiofrequency probe, the tip, and the filament as a monopolar electrode.

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11. (New) The method of claim 3, wherein the tip comprises a conductive material, and wherein said inserting the radiofrequency probe into the lumen of the needle such that the radiofrequency probe contacts the conductive portion of the needle comprises contacting a distal end of the radiofrequency probe to the conductive material of the tip.

12. (New) The method of claim 3, further comprising:

after said inserting the needle into the patient, moving the needle to a target volume within the patient that includes a nerve; and

ablating the nerve to relieve pain of the patient.

13. (New) The method of claim 12, wherein said inserting the needle into the patient comprises inserting the needle within 30 degrees of perpendicular to a surface of the patient.

14. (New) The method of claim 12, wherein the nerve comprises a medial branch nerve proximate a lumbar facet joint of the patient.

15. (New) The method of claim 14, wherein said inserting the needle into the patient comprises inserting the needle within 30 degrees of perpendicular to a surface of the patient.

16. (New) The method of claim 12, wherein the nerve comprises a medial branch nerve positioned in an intertransverse space between adjacent thoracic vertebrae of the patient.

17. (New) The method of claim 12, wherein the nerve is proximate a cervical zygapophyseal joint of the patient.

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18. (New) The method of claim 12, wherein the nerve comprises a posterior ramus of a sacroiliac joint of the patient.

19. (New) The method of claim 12, wherein the nerve comprises an afferent nociceptive nerve.

20. (New) The method of claim 12, wherein said ablating comprises forming a lesion that includes the nerve and has a maximum cross dimension that is 10 millimeters or larger.

21. (New) The method of claim 12, wherein said ablating comprises forming a lesion that includes the nerve and has a volume of about 500 mm^3.

22. (New) The method of claim 3, wherein the probe is spaced from the tip during said operating the radiofrequency probe, the tip, and the filament as a monopolar electrode.

23. (New) The method of claim 3, wherein the probe directly contacts the tip during said operating the radiofrequency probe, the tip, and the filament as a monopolar electrode.

24. (New) A method comprising:

introducing a needle into a patient, the needle comprising:

an elongate member;

a lumen within the elongate member; and

a filament in a retracted position relative to the elongate member;

moving the filament to a deployed position within the patient;

inserting a radiofrequency probe into the lumen of the needle;

physically contacting the radiofrequency probe to a conductive portion of the needle at a distal end of the needle; and

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operating the radiofrequency probe and the filament as a monopolar electrode while the radiofrequency probe contacts the conductive portion of the needle, such that radiofrequency energy from the radiofrequency probe passes through the conductive portion of the needle and is transmitted by the filament.

25. (New) The method of claim 24, wherein the needle further comprises a piercing tip at a distal end of the elongate member, and wherein said operating the radiofrequency probe and the filament as a monopolar electrode further comprises operating the tip together with the radiofrequency probe and the filament as the monopolar electrode.

26. (New) The method of claim 25, wherein said physically contacting the radiofrequency probe to a conductive portion of the needle at a distal end of the needle comprises physically contacting the radiofrequency probe to the tip.

27. (New) The method of claim 24, wherein said moving the filament to a deployed position within the patient takes place prior to said inserting the radiofrequency probe into the lumen of the needle.

28. (New) The method of claim 24, wherein the needle further comprises a fitting in fluid communication with the lumen, the method further comprising:

connecting a fluid source to the fitting;

transporting fluid through the lumen of the needle to a target volume within the patient; and

disconnecting the fluid source from the fitting.

29. (New) The method of claim 24, further comprising:

after said inserting the needle into the patient, moving the needle to a target volume within the patient that includes a nerve; and

ablating the nerve to relieve pain of the patient.

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30. (New) The method of claim 29, wherein the nerve is a medial branch nerve proximate a lumbar facet joint of the patient, a medial branch nerve positioned in an intertransverse space between adjacent thoracic vertebrae of the patient, a cervical zygapophyseal joint of the patient, or a posterior ramus of a sacroiliac joint of the patient.

31. (New) The method of claim 29, wherein said ablating comprises forming a lesion that includes the nerve and has a maximum cross dimension that is 10 millimeters or larger.

32. (New) The method of claim 29, wherein said ablating comprises forming a lesion that includes the nerve and has a volume of about 500 mm^3.

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 113 of 385

Amendments to the Specification

Please replace the title of the Application, which begins at the top of page 1 of the specification, with the following amended title:

METHODS ~~AND SYSTEMS~~ FOR ~~SPINAL~~ RADIO FREQUENCY NEUROTOMY

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 114 of 385

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/933,995	Filing Date 07/20/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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		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	

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	09/02/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 20	= 10		x $50 =	500
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	500

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

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 1 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1.	D372,086	07-23-1996	Grasso et al.	
	2.	RE40,279	04-29-2008	Sluijter et al.	
	3.	RE40,388	06-17-2008	Gines	
	4.	4,011,872	03-15-1977	Kamiya	
	5.	4,206,761	06-10-1980	Cosman	
	6.	4,206,762	06-10-1980	Cosman	
	7.	4,281,667	08-04-1981	Cosman	
	8.	4,353,371	10-12-1982	Cosman	
	9.	4,375,220	03-01-1983	Matvias	
	10.	4,378,809	04-05-1983	Cosman	
	11.	4,385,636	05-31-1983	Cosman	
	12.	4,411,266	10-25-1983	Cosman	
	13.	4,565,200	01-21-1986	Cosman	
	14.	4,573,980	03-04-1986	Karrasch et al.	
	15.	4,583,538	04-22-1986	Onik et al.	
	16.	4,593,703	06-10-1986	Cosman	
	17.	4,618,978	10-21-1986	Cosman	
	18.	4,646,752	03-03-1987	Swann et al.	
	19.	4,653,508	03-31-1987	Cosman	
	20.	4,660,568	04-28-1987	Cosman	
	21.	4,676,255	06-30-1987	Cosman	
	22.	4,698,207	10-06-1987	Bringham et al.	
	23.	4,787,886	11-29-1988	Cosman	
	24.	4,796,615	01-10-1989	Bullock et al.	
	25.	4,827,927	05-09-1989	Newton	
	26.	4,838,265	06-13-1989	Cosman et al.	
	27.	4,886,506	12-12-1989	Lovgren et al.	
	28.	4,907,589	03-13-1990	Cosman	

Examiner Signature	Date Considered

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

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	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 2 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	29.	4,966,597	10-30-1990	Cosman	
	30.	5,010,897	04-30-1991	Leveen	
	31.	5,160,337	11-03-1992	Cosman	
	32.	5,217,457	06-08-1993	Delahuerga et al.	
	33.	5,230,623	07-27-1993	Guthrie et al.	
	34.	5,233,515	08-03-1993	Cosman	
	35.	5,244,462	09-14-1993	Delahuerga et al.	
	36.	5,257,630	11-02-1993	Braitman et al.	
	37.	5,291,896	03-08-1994	Fonger et al.	
	38.	5,304,114	04-19-1994	Cosman et al.	
	39.	5,304,115	04-19-1994	Pflueger et al.	
	40.	5,312,329	05-17-1994	Beaty et al.	
	41.	5,312,391	05-17-1994	Wilk	
	42.	5,318,013	06-07-1994	Wilk	
	43.	5,324,255	06-28-1994	Passafaro et al.	
	44.	5,334,183	08-02-1994	Wuchinich	
	45.	5,342,292	08-30-1994	Nita et al.	
	46.	5,370,645	12-06-1994	Klicek et al.	
	47.	5,370,675	12-06-1994	Edwards et al.	
	48.	5,372,596	12-13-1994	Klicek et al.	
	49.	5,377,685	01-03-1995	Kazi et al.	
	50.	5,397,301	03-14-1995	Pflueger et al.	
	51.	5,401,272	03-28-1995	Perkins	
	52.	5,421,923	06-06-1995	Clarke et al.	
	53.	5,422,567	06-06-1995	Matsunaga	
	54.	5,423,809	06-13-1995	Klicek	
	55.	5,433,739	07-18-1995	Sluijter et al.	
	56.	5,447,417	09-05-1995	Kuhl et al.	

Examiner Signature	Date Considered

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

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	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 3 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	57.	5,458,597	10-17-1995	Edwards et al.	
	58.	5,472,441	12-05-1995	Edwards et al.	
	59.	5,472,442	12-05-1995	Klicek	
	60.	5,474,057	12-12-1995	Makower et al.	
	61.	5,484,398	01-16-1996	Stoddard	
	62.	5,496,312	03-05-1996	Klicek	
	63.	5,507,743	04-16-1996	Edwards et al.	
	64.	5,511,564	04-30-1996	Wilk	
	65.	5,514,129	05-07-1996	Smith	
	66.	5,536,267	07-16-1996	Edwards et al.	
	67.	5,541,376	07-30-1996	Ladtkow et al.	
	68.	5,560,358	10-01-1996	Arnold et al.	
	69.	5,562,703	10-08-1996	Desai	
	70.	5,571,147	11-05-1996	Sluijter et al.	
	71.	5,580,665	12-03-1996	Taguchi et al.	
	72.	5,599,345	02-04-1997	Edwards et al.	
	73.	5,599,346	02-04-1997	Edwards et al.	
	74.	5,611,709	03-18-1997	McAnulty	
	75.	5,613,966	03-25-1997	Makower et al.	
	76.	5,628,743	05-13-1997	Cimino	
	77.	5,662,111	09-02-1997	Cosman	
	78.	5,662,620	09-02-1997	Lieber et al.	
	79.	5,662,680	09-02-1997	Desai	
	80.	5,667,488	09-16-1997	Lundquist et al.	
	81.	5,669,904	09-23-1997	Platt, Jr. et al.	
	82.	5,672,173	09-30-1997	Gough et al.	
	83.	5,672,174	09-30-1997	Gough et al.	
	84.	5,683,349	11-04-1997	Makower et al.	

Examiner Signature	Date Considered

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

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SHEET 4 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	85.	5,683,384	11-04-1997	Gough et al.	
	86.	5,701,575	12-23-1997	Taguchi et al.	
	87.	5,720,744	02-24-1998	Eggleston et al.	
	88.	5,728,143	03-17-1998	Gough et al.	
	89.	5,735,847	04-07-1998	Gough et al.	
	90.	5,738,648	04-14-1998	Lands et al.	
	91.	5,748,703	05-05-1998	Cosman	
	92.	5,749,689	05-12-1998	Konig	
	93.	5,755,754	05-26-1998	Rudie et al.	
	94.	5,768,679	06-16-1998	Taguchi et al.	
	95.	5,772,659	06-30-1998	Becker et al.	
	96.	5,778,043	07-07-1998	Cosman	
	97.	5,782,827	07-21-1998	Gough et al.	
	98.	5,792,146	08-11-1998	Cosman	
	99.	5,797,906	08-25-1998	Rhum et al.	
	100.	5,800,484	09-01-1998	Gough et al.	
	101.	5,807,309	09-15-1998	Lundquist et al.	
	102.	5,810,804	09-22-1998	Gough et al.	
	103.	5,827,271	10-27-1998	Buysse et al.	
	104.	5,827,276	10-27-1998	LeVeen et al.	
	105.	5,848,967	12-15-1998	Cosman	
	106.	5,855,576	01-05-1999	LeVeen et al.	
	107.	5,863,290	01-26-1999	Gough et al.	
	108.	5,868,740	02-09-1999	LeVeen et al.	
	109.	5,911,739	06-15-1999	Kordis et al.	
	110.	5,913,855	06-22-1999	Gough et al.	
	111.	5,921,992	07-13-1999	Costales et al.	
	112.	5,925,042	07-20-1999	Gough et al.	

Examiner Signature	Date Considered

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	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
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U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	113.	5,928,229	07-27-1999	Gough et al.	
	114.	5,935,123	08-10-1999	Edwards et al.	
	115.	5,951,547	09-14-1999	Gough et al.	
	116.	5,968,040	10-19-1999	Swanson et al.	
	117.	5,980,517	11-09-1999	Gough	
	118.	5,983,141	11-09-1999	Sluijter et al.	
	119.	6,006,126	12-21-1999	Cosman	
	120.	6,013,076	01-11-2000	Goble et al.	
	121.	6,014,590	01-11-2000	Whayne et al.	
	122.	6,015,406	01-18-2000	Goble et al.	
	123.	6,016,452	01-18-2000	Kasevich	
	124.	6,039,733	03-21-2000	Buysse et al.	
	125.	6,041,260	03-21-2000	Stern et al.	
	126.	6,044,846	04-04-2000	Edwards	
	127.	6,050,992	04-18-2000	Nichols	
	128.	6,053,937	04-25-2000	Edwards et al.	
	129.	6,059,780	05-09-2000	Gough et al.	
	130.	6,068,627	05-30-2000	Orszulak et al.	
	131.	6,071,280	06-06-2000	Edwards et al.	
	132.	6,080,150	06-27-2000	Gough	
	133.	6,090,105	07-18-2000	Zepeda et al.	
	134.	6,106,521	08-22-2000	Blewett et al.	
	135.	6,117,134	09-12-2000	Cunningham et al.	
	136.	6,122,341	09-19-2000	Butler et al.	
	137.	6,129,726	10-10-2000	Edwards et al.	
	138.	6,132,425	10-17-2000	Gough	
	139.	6,139,519	10-31-2000	Blythe	
	140.	6,139,547	10-31-2000	Lontine et al.	

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	141.	6,143,003	11-07-2000	Cosman	
	142.	6,146,380	11-14-2000	Racz et al.	
	143.	6,161,048	12-12-2000	Sluijter et al.	
	144.	6,165,169	12-26-2000	Panescu et al.	
	145.	6,167,295	12-26-2000	Cosman	
	146.	6,179,834	01-30-2001	Buysse et al.	
	147.	6,210,403	04-03-2001	Klicek	
	148.	6,213,999	04-10-2001	Platt, Jr. et al.	
	149.	6,217,554	04-17-2001	Green	
	150.	6,228,080	05-08-2001	Gines	
	151.	6,228,083	05-08-2001	Lands et al.	
	152.	6,231,570	05-15-2001	Tu et al.	
	153.	6,234,178	05-22-2001	Goble et al.	
	154.	6,235,023	05-22-2001	Lee et al.	
	155.	6,241,725	06-05-2001	Cosman	
	156.	6,241,726	06-05-2001	Chia et al.	
	157.	6,246,912	06-12-2001	Sluijter et al.	
	158.	6,251,106	06-26-2001	Becker et al.	
	159.	6,259,952	07-10-2001	Sluijter et al.	
	160.	6,268,200	07-31-2001	Tucker et al.	
	161.	6,275,725	08-14-2001	Cosman	
	162.	6,277,117	08-21-2001	Tetzlaff et al.	
	163.	6,280,441	08-28-2001	Ryan	
	164.	6,312,426	11-06-2001	Goldberg et al.	
	165.	6,330,478	12-11-2001	Lee et al.	
	166.	6,331,180	12-18-2001	Cosman et al.	
	167.	6,334,861	01-01-2002	Chandler et al.	
	168.	6,352,536	03-05-2002	Buysse et al.	

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	169.	6,402,743	06-11-2002	Orszulak et al.	
	170.	6,402,747	06-11-2002	Lindermann et al.	
	171.	6,405,072	06-11-2002	Cosman	
	172.	6,416,520	07-09-2002	Kynast et al.	
	173.	6,419,653	07-16-2002	Edwards et al.	
	174.	6,419,680	07-16-2002	Cosman et al.	
	175.	6,419,798	07-16-2002	Topolkaraev et al.	
	176.	6,425,887	07-30-2002	McGuckin et al.	
	177.	6,440,127	08-27-2002	McGovern et al.	
	178.	6,447,477	09-10-2002	Burney et al.	
	179.	6,447,505	09-10-2002	McGovern et al.	
	180.	6,451,018	09-17-2002	Lands et al.	
	181.	6,454,765	09-24-2002	Leveen et al.	
	182.	6,458,130	10-01-2002	Frazier et al.	
	183.	6,459,769	10-01-2002	Cosman	
	184.	6,464,704	10-15-2002	Schmaltz et al.	
	185.	6,468,273	10-22-2002	Leveen et al.	
	186.	6,471,698	10-29-2002	Edwards et al.	
	187.	6,478,793	11-12-2002	Cosman et al.	
	188.	6,500,175	12-31-2002	Gough et al.	
	189.	6,506,189	01-14-2003	Rittman, III et al.	
	190.	6,517,534	02-11-2003	McGovern et al.	
	191.	6,530,922	03-11-2003	Cosman et al.	
	192.	6,533,987	03-18-2003	Topolkaraev et al.	
	193.	6,551,311	04-22-2003	Lee et al.	
	194.	6,562,033	05-13-2003	Shah et al.	
	195.	6,565,562	05-20-2003	Shah et al.	
	196.	6,569,159	05-27-2003	Edwards et al.	

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	197.	6,575,967	06-10-2003	Leveen et al.	
	198.	6,575,969	06-10-2003	Rittman, III et al.	
	199.	6,585,735	07-01-2003	Frazier et al.	
	200.	6,602,249	08-05-2003	Stoddard et al.	
	201.	6,605,085	08-12-2003	Edwards	
	202.	6,610,054	08-26-2003	Edwards et al.	
	203.	6,622,731	09-23-2003	Daniel et al.	
	204.	6,623,481	09-23-2003	Garbagnati et al.	
	205.	6,632,221	10-14-2003	Edwards et al.	
	206.	6,632,222	10-14-2003	Edwards et al.	
	207.	6,638,275	10-28-2003	McGaffigan et al.	
	208.	6,641,580	11-04-2003	Edwards et al.	
	209.	6,645,201	11-11-2003	Utley et al.	
	210.	6,652,515	11-25-2003	Maguire et al.	
	211.	6,652,516	11-25-2003	Gough	
	212.	6,660,002	12-09-2003	Edwards et al.	
	213.	6,660,362	12-09-2003	Lindsay et al.	
	214.	6,663,624	12-16-2003	Edwards et al.	
	215.	6,669,693	12-30-2003	Friedman	
	216.	6,682,526	01-27-2004	Jones et al.	
	217.	6,682,528	01-27-2004	Frazier et al.	
	218.	6,685,701	02-03-2004	Orszulak et al.	
	219.	6,689,127	02-10-2004	Gough et al.	
	220.	6,690,210	02-10-2004	Hadjizada et al.	
	221.	6,692,490	02-17-2004	Edwards	
	222.	6,706,152	03-16-2004	Burazin et al.	
	223.	6,723,092	04-20-2004	Brown et al.	
	224.	6,743,226	06-01-2004	Cosman et al.	

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	225.	6,743,229	06-01-2004	Buysse et al.	
	226.	6,746,570	06-08-2004	Burazin et al.	
	227.	6,749,719	06-15-2004	Burazin et al.	
	228.	6,770,070	08-03-2004	Balbierz	
	229.	6,780,180	08-24-2004	Goble et al.	
	230.	6,803,549	10-12-2004	Yu	
	231.	6,814,712	11-09-2004	Edwards et al.	
	232.	6,837,956	01-04-2005	Cowell et al.	
	233.	6,846,448	01-25-2005	Rymer et al.	
	234.	6,847,848	01-25-2005	Sterzer et al.	
	235.	6,852,091	02-08-2005	Edwards et al.	
	236.	6,866,663	03-15-2005	Edwards et al.	
	237.	6,881,214	04-19-2005	Cosman et al.	
	238.	6,889,089	05-03-2005	Behl et al.	
	239.	6,896,675	05-24-2005	Leung et al.	
	240.	6,932,810	08-23-2005	Ryan	
	241.	6,958,062	10-25-2005	Gough et al.	
	242.	6,958,064	10-25-2005	Rioux et al.	
	243.	6,961,602	11-01-2005	Fuimaono et al.	
	244.	6,964,660	11-15-2005	Maguire et al.	
	245.	6,966,908	11-22-2005	Maguire et al.	
	246.	6,974,455	12-13-2005	Garabedian et al.	
	247.	6,997,925	02-14-2006	Maguire et al.	
	248.	7,025,767	04-11-2006	Schaefer et al.	
	249.	7,033,353	04-25-2006	Stoddard et al.	
	250.	7,044,949	05-16-2006	Orszulak et al.	
	251.	7,048,733	05-23-2006	Hartley et al.	
	252.	7,056,320	06-06-2006	Utley et al.	

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	253.	7,074,484	07-11-2006	Topolkaraev et al.	
	254.	7,076,399	07-11-2006	Godara	
	255.	7,087,051	08-08-2006	Bourne et al.	
	256.	7,099,712	08-29-2006	Fuimaono et al.	
	257.	7,108,696	09-19-2006	Daniel et al.	
	258.	7,112,197	09-26-2006	Hartley et al.	
	259.	7,115,124	10-03-2006	Xiao	
	260.	7,138,088	11-21-2006	Wariar et al.	
	261.	7,150,743	12-19-2006	Zvuloni et al.	
	262.	7,150,744	12-19-2006	Edwards et al.	
	263.	7,160,296	01-09-2007	Pearson et al.	
	264.	7,163,536	01-16-2007	Godara	
	265.	7,179,256	02-20-2007	Mest	
	266.	7,179,258	02-20-2007	Buysse et al.	
	267.	7,207,990	04-24-2007	Lands et al.	
	268.	7,258,688	08-21-2007	Shah et al.	
	269.	7,266,414	09-04-2007	Cornelius et al.	
	270.	7,270,660	09-18-2007	Ryan	
	271.	7,270,662	09-18-2007	Visram et al.	
	272.	7,276,064	10-02-2007	Paul et al.	
	273.	7,281,666	10-16-2007	Smith	
	274.	7,294,127	11-13-2007	Leung et al.	
	275.	7,306,596	12-11-2007	Hillier et al.	
	276.	7,311,702	12-25-2007	Tallarida et al.	
	277.	7,340,307	03-04-2008	Maguire et al.	
	278.	7,354,436	04-08-2008	Rioux et al.	
	279.	7,357,798	04-15-2008	Sharps et al.	
	280.	7,371,234	05-13-2008	Young	

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	281.	7,387,626	06-17-2008	Edwards et al.	
	282.	7,387,630	06-17-2008	Mest	
	283.	7,416,549	08-26-2008	Young et al.	
	284.	7,449,020	11-11-2008	Edwards et al.	
	285.	7,468,062	12-23-2008	Oral et al.	
	286.	7,480,533	01-20-2009	Cosman et al.	
	287.	7,517,346	04-14-2009	Sloan et al.	
	288.	7,524,318	04-28-2009	Young et al.	
	289.	7,533,002	05-12-2009	Godara	
	290.	7,549,986	06-23-2009	Rioux et al.	
	291.	7,561,907	07-14-2009	Fuimaono et al.	
	292.	7,593,778	09-22-2009	Chandran et al.	
	293.	7,596,469	09-29-2009	Godara	
	294.	7,615,050	11-10-2009	Cross et al.	
	295.	7,670,336	03-02-2010	Young et al.	
	296.	7,670,337	03-02-2010	Young	
	297.	7,678,106	03-16-2010	Lee	
	298.	7,699,844	04-20-2010	Utley et al.	
	299.	7,704,248	04-27-2010	Dicarlo	
	300.	7,771,420	08-10-2010	Butty et al.	
	301.	7,794,458	09-14-2010	McIntyre et al.	
	302.	7,794,459	09-14-2010	Faure	
	303.	7,797,049	09-14-2010	Christopherson et al.	
	304.	7,799,021	09-21-2010	Leung et al.	
	305.	7,815,571	10-19-2010	Deckman et al.	
	306.	7,819,869	10-26-2010	Godara et al.	
	307.	7,819,871	10-26-2010	Paul et al.	
	308.	7,824,404	11-02-2010	Godara et al.	

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	309.	7,828,796	11-09-2010	Wong et al.	
	310.	7,874,986	01-25-2011	Deckman et al.	
	311.	7,875,025	01-25-2011	Cockburn et al.	
	312.	7,892,231	02-22-2011	Elliott	
	313.	7,896,874	03-01-2011	Young et al.	
	314.	2002/0026185	02-28-2002	Gough	
	315.	2002/0029037	03-07-2002	Kim	
	316.	2002/0188275	12-12-2002	McGuckin, Jr.	
	317.	2003/0018332	01-23-2003	Schmaltz et al.	
	318.	2003/0078595	04-24-2003	Cosman	
	319.	2004/0006336	01-08-2004	Swanson	
	320.	2004/0015176	01-22-2004	Cosman	
	321.	2004/0015218	01-22-2004	Finch et al.	
	322.	2004/0100376	05-27-2004	Lye et al.	
	323.	2004/0122482	06-24-2004	Tung et al.	
	324.	2004/0143262	07-22-2004	Visram et al.	
	325.	2004/0176759	09-09-2004	Krishnamurthy et al.	
	326.	2004/0230187	11-18-2004	Lee et al.	
	327.	2004/0260282	12-23-2004	Gough et al.	
	328.	2005/0033279	02-10-2005	Edwards et al.	
	329.	2005/0059964	03-17-2005	Fitz	
	330.	2005/0101944	05-12-2005	Williams	
	331.	2005/0101950	05-12-2005	Gough et al.	
	332.	2005/0165391	07-28-2005	Maguire et al.	
	333.	2005/0171522	08-04-2005	Christopherson	
	334.	2005/0177209	08-11-2005	Leung et al.	
	335.	2005/0177211	08-11-2005	Leung et al.	
	336.	2005/0203503	09-15-2005	Edwards et al.	

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	337.	2005/0234445	10-20-2005	Conquergood et al.	
	338.	2005/0240174	10-27-2005	Pearson et al.	
	339.	2005/0267552	12-01-2005	Conquergood et al.	
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	353.	2006/0206129	09-14-2006	Conquergood et al.	
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	358.	2006/0206134	09-14-2006	Conquergood et al.	
	359.	2006/0217705	09-28-2006	Godara et al.	
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	362.	2006/0259027	11-16-2006	Kwan et al.	
	363.	2006/0271036	11-30-2006	Garabedian et al.	
	364.	2007/0006215	01-04-2007	Epstein et al.	

Examiner Signature	Date Considered

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 14 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	365.	2007/0016183	01-18-2007	Lee et al.	
	366.	2007/0027449	02-01-2007	Godara et al.	
	367.	2007/0060921	03-15-2007	Janssen et al.	
	368.	2007/0112342	05-17-2007	Pearson et al.	
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	370.	2007/0123964	05-31-2007	Davies et al.	
	371.	2007/0156136	07-05-2007	Godara et al.	
	372.	2007/0161905	07-12-2007	Munrow	
	373.	2007/0167943	07-19-2007	Janssen et al.	
	374.	2007/0179380	08-02-2007	Grossman	
	375.	2007/0179491	08-02-2007	Kratoska et al.	
	376.	2007/0185522	08-09-2007	Davies et al.	
	377.	2007/0203402	08-30-2007	Godara et al.	
	378.	2007/0203486	08-30-2007	Young	
	379.	2007/0260234	11-08-2007	Mccullagh et al.	
	380.	2007/0282321	12-06-2007	Shah et al.	
	381.	2008/0015569	01-17-2008	Saadat et al.	
	382.	2008/0033493	02-07-2008	Deckman et al.	
	383.	2008/0045939	02-21-2008	Lee	
	384.	2008/0045940	02-21-2008	Lee	
	385.	2008/0048786	02-28-2008	Feldkamp et al.	
	386.	2008/0065062	03-13-2008	Leung et al.	
	387.	2008/0154259	06-26-2008	Gough et al.	
	388.	2008/0167646	07-10-2008	Godara et al.	
	389.	2008/0167649	07-10-2008	Edwards et al.	
	390.	2008/0208121	08-28-2008	Youssef et al.	
	391.	2008/0228180	09-18-2008	Epstein	
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Examiner Signature	Date Considered

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	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 15 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	393.	2008/0269739	10-30-2008	Young et al.	
	394.	2008/0275443	11-06-2008	Oral et al.	
	395.	2009/0024124	01-22-2009	Lefler et al.	
	396.	2009/0054962	02-26-2009	Lefler et al.	
	397.	2009/0099544	04-16-2009	Munrow et al.	
	398.	2009/0131790	05-21-2009	Munrow et al.	
	399.	2009/0138011	05-28-2009	Epstein	
	400.	2009/0187177	07-23-2009	Epstein	
	401.	2009/0187182	07-23-2009	Epstein et al.	
	402.	2009/0187183	07-23-2009	Epstein	
	403.	2009/0198232	08-06-2009	Young et al.	
	404.	2009/0221998	09-03-2009	Epstein et al.	
	405.	2009/0228001	09-10-2009	Pacey	
	406.	2009/0287081	11-19-2009	Grossman et al.	
	407.	2009/0299358	12-03-2009	Lafontaine	
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	409.	2010/0042098	02-18-2010	Cross et al.	
	410.	2010/0056926	03-04-2010	Deckman et al.	
	411.	2010/0076303	03-25-2010	McKinley	
	412.	2010/0099980	04-22-2010	Godara et al.	
	413.	2010/0114095	05-06-2010	Janssen et al.	
	414.	2010/0130974	05-27-2010	Young et al.	
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	418.	7,270,661	09-18-2007	Dahla et al.	
	419.	2007/0287996	12-13-2007	Rioux	

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	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
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SHEET 16 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	420.	2004/0199179	10-07-2004	Elliott	
	421.	2006/0229645	10-12-2006	Bonnette et al.	
	422.	2004/0158239	08-12-2004	Behl et al.	
	423.	2007/0112340	05-17-2007	Thomas et al.	
	424.	2008/0161804	07-03-2008	Rioux et al.	
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	426.	2008/0269558	10-30-2008	Yahagi et al.	
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	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 17 OF 20	Attorney Docket No.	NBUS.001C1C1

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]
	433.	DE 2124684	11-30-1972	Stadelmayr		
	434.	GB 2423024	08-16-2006	Instrumedical Ltd		
	435.	WO 96/29946	10-03-1996	Board of Regents of the University of Nebraska		
	436.	WO 2011/057157	05-12-2011	Wright		
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	438.	JP2003-527888	09-24-2003	NEOTHERMIA CORPORATION		X - Abs
	439.	WO 97/06739	02-27-1997	ZOMED INT INC.		
	440.	JP2008-516667	05-22-2008	BOSTON SCIENTIFIC SCIMED, INC.		X

Examiner Signature	Date Considered

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SHEET 18 OF 20	Attorney Docket No.	NBUS.001C1C1

NON PATENT LITERATURE DOCUMENTS			
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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	441.	BARAUSKAS et al., Investigation of radiofrequency ablation process in liver tissue by finite element modeling and experiment, *Medicina (Kaunas),* Vol. 43(4), pp. 310-325, 2007.	
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	449.	LORD et al., Percutaneous Radio-Frequency Neurotomy for Chronic Cervical Zygapophyseal-Joint Pain, *New England Journal of Medicine,* Vol. 335(23), pp. 1721-1726, December 5, 2006.	
	450.	MULIER et al., Electrodes and multiple electrode systems for radiofrequency ablation: a proposal for updated terminology, *European Radiology,* Vol. 15, pp. 798-808, 2005, Epub February 12, 2005.	
	451.	O'ROURKE et al., Current status of liver tumor ablation devices, *Expert Rev. Med. Devices,* Vol. 4(4), pp. 523-537, 2007.	
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Examiner Signature	Date Considered

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	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 19 OF 20	Attorney Docket No.	NBUS.001C1C1

NON PATENT LITERATURE DOCUMENTS

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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	454.	Baylis Medical Company, Inc., Pain Management; SInergy™ System, April 2008, in 6 pages.	
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	456.	Baylis Medical Company, Inc., For Thoracic Medial Branch Neurotomy; ThoraCool™ Pain Management System, 2009, in 3 pages.	
	457.	Boston Scientific, LeVeen® Needle Electrodes; The Choice for Open, Laparoscopic or Percutaneous Radiofrequency Ablation, 2006, in 2 pages.	
	458.	Boston Scientific, LeVeen® CoAccess™ Electrode System; Coaxial Radiofrequency Ablation Device, 2006, in 2 pages.	
	459.	Diros Technology Inc., OWL Pain Management Sets, http://www.dirostech.com/22.php, (no date), in 3 pages.	
	460.	Diros Technology Inc., OWL Sterile Single Use (Disposable) RF Probes, http://www.dirostech.com/productdetail.php?a=16&b+3, 2007, in 1 page.	
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	465.	NeuroTherm®, http://www.neurotherm.com/interventional_pain_prod_electrodes.htm, 2007, in 2 pages.	
	466.	NeuroTherm®, One System, Multiple Applications, March 2007, in 2 pages.	
	467.	NeuroTherm®, RF for Pain Management; Disposable RF Electrode, (no date) in 2 pages.	
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	469.	Rex Medical, Quadra-Fuse; Multi-pronged Injection Needle, http://www.rexmedical.com/quadra-fuse.html, 2010, in 2 pages.	
	470.	Smith & Nephew Endoscopy, Electrothermal 20S Spine System, http://endo.smith-nephew.com/fr/node.asp?Nodeld=3592, (no date) in 2 pages.	
	471.	Stryker Instruments, "MultiGen™ One Machine; Four Lesions; Multiple Options," July 2008, in 8 pages.	

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	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 20 OF 20	Attorney Docket No.	NBUS.001C1C1

NON PATENT LITERATURE DOCUMENTS

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	472.	International Search Report and Written Opinion of the International Searching Authority for International Application No. PCT/US2010/055744, mailed on March 1, 2011, in 34 pages.	
	473.	International Preliminary Report on Patentability issued in PCT/US2011/035253, dated November 27, 2012.	
	474.	International Search Report and Written Opinion of the International Searching Authority for International Application No. PCT/US2011/035253 mailed on August 18, 2011.	
	475.	Patent Examination Report issued in Australian Application No. 2011256709, dated March 22, 2013.	
	476.	Patent Examination Report issued in Australian Application No. 2010314930, dated July 26, 2013.	
	477.	Notice of Acceptance issued in Australian Application No. 2010314930, dated October 14, 2013.	
	478.	Notice of Acceptance issued in Australian Application No. 2011256709, dated October 10, 2013.	
	479.	Office Action issued in U.S. Application No. 13/101,009, dated March 6, 2014.	
	480.	Office Action issued in Japanese Application No. 2012-538056, dated May 19, 2014.	
	481.	Supplemental European Search Report and Search Opinion issued in EP Application No. 10829203.8, mailed May 9, 2014.	
	482.	Final Office Action issued in U.S. Application No. 13/101,009, dated July 3, 2014.	
	483.	Supplemental European Search Report and Search Opinion issued in EP Application No. 11783944, dated June 23, 2014.	
	484.	Office Action issued in Japanese Application No. 2013-511205, dated August 4, 2014.	X
	485.	Office Action issued in U.S. Application No. 13/101,009, dated October 17, 2014.	
	486.	Office Action issued in Chinese Application No. 201180035655.7, dated August 25, 2014.	X
	487.	Office Action issued in Korean Application No. 10-2012-7033363, dated December 23, 2014.	X
	488.	Patent Examination Report issued in Australian Application No. 2014200132, dated December 1, 2014.	
	489.	Office Action issued in Japanese Application No. 2012-538056, dated February 2, 2015.	

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Electronic Acknowledgement Receipt

EFS ID:	40777387
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	08:54:00
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	NBUS001C1C1_IDS_Grandparent_Resubmission.pdf	112377 0e1665ffdb01cffdbbc6ac79952f591dc34e57f3	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	NBUS001C1C1_Reference_Form_Grandparent_Resubmission.pdf	296250 370405e678106ed2b6724cf6e24284332aee7cc4	no	20
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
			Total Files Size (in bytes):	408627	

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a PTO/SB/08 Equivalent listing 489 references. Each of these 489 references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the 489 references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of U.S. patent application publications and U.S. patents are not required. Accordingly, no copies of reference numbers 1 through 432 are submitted.

Further, pursuant to 37 C.F.R. § 1.98(d), copies of reference numbers 433 through 489 are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY

Petitioner's Exhibit 1008
Avanos v. Stratus
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Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

Copies of these patent applications, including any pending claims, office actions, notices of allowance, and/or other communications, are available through PALM and/or PAIR. However, if the Examiner so requests, the Applicant will be happy to provide the Examiner with copies of any applications, pending claims, office actions, notices of allowance, communications, or any other documents, at any time.

DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
(801) 703-1961

Petitioner's Exhibit 1008
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PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5383917		1995-01-24	Desai et al.	
	2	5486161		1996-01-23	Lax et al.	
	3	5749846		1998-05-12	Edwards et al.	
	4	5893847		1999-04-13	Kordis	
	5	6045532		2000-04-04	Eggers et al.	
	6	6105581		2000-08-22	Eggers et al.	
	7	6210406		2001-04-03	Webster	
	8	6216043		2001-04-10	Swanson et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	9	6221071		2001-04-24	Sherry et al.	
	10	6287304		2001-09-11	Eggers et al.	
	11	6461314		2002-10-08	Pant et al.	
	12	6471695		2002-10-29	Behl	
	13	6699242		2004-03-02	Heggeness	
	14	6740080		2004-05-25	Jain et al.	
	15	6752804		2004-06-22	Simpson et al.	
	16	6962587		2005-11-08	Johsnon et al.	
	17	6989004		2006-01-24	Hinchliffe et al.	
	18	7229438		2007-06-12	Young	
	19	7318822		2008-01-15	Darmos et al.	

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	20	7344533		2008-03-18	Pearson et al.	
	21	7393351		2008-07-01	Woloszko et al.	
	22	7399299		2008-07-15	Daniel et al.	
	23	7416549		2008-08-26	Young et al.	
	24	7419487		2008-09-02	Johnson et al.	
	25	7458971		2008-12-02	Zerfas et al.	
	26	7678107		2010-03-16	Young	
	27	7846157		2010-12-07	Kozel	
	28	7896871		2011-03-01	Bhushan et al.	
	29	8262574		2012-09-11	Placek et al.	
	30	8512330		2013-08-20	Epstein et al.	

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	31	8518037		2013-08-27	Young	
	32	8753335		2014-06-17	Moshe et al.	
	33	9402560		2016-08-02	Organ et al.	
	34	9675406		2017-06-13	Moss 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
	1	20020022864		2002-02-21	Mahvi et al.	
	2	20020133148		2002-09-19	Daniel et al.	
	3	20030199862		2003-10-23	Simpson et al.	
	4	20040064137		2004-04-01	Pellegrino et al.	
	5	20070010809		2007-01-11	Hovda et al.	

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	6	20070213703		2007-09-13	Naam et al.	
	7	20080249523		2008-10-09	McPherson et al.	
	8	20090306604		2009-12-10	Darmos et al.	
	9	20100076340		2010-03-25	Eckstein et al.	
	10	20110184403		2011-07-28	Brannan	
	11	20130096549		2013-04-18	Organ et al.	
	12	20170065334		2017-03-09	Wright et al.	

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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	2017203754	AU		2017-06-22	Diros Technology Inc.		
	2	1211171	CN	A	1999-03-17	RITA MEDICAL SYSTEMS, INC.		X

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	Attorney Docket Number	NBUS.001C1C1

	3	1338909	CN	A	2002-03-06	Transurgical, Inc.		☒
	4	2418844	CN		2001-02-14	LOW TEMPERATURE TECHNOLOGY TESTING CENTER		☒
	5	1645235	EP	B1	2010-11-08	Covidien AG		☐
	6	1059067	EP	B1	2005-04-06	Sherwood Services AG		☐
	7	2003-527888	JP		2003-09-24	NEOTHERMIA CORPORATION		☒
	8	2009-504201	JP		2009-02-05	HALT MEDICAL, INC.		☒
	9	4290894	JP	B2	2009-04-10	ASUROKEA CORP		☒
	10	2001-527428	JP		2001-12-25	VIDAMED, INC.		☒
	11	2004-267759	JP		2004-09-30	Depuy Acromed, Inc.		☒
	12	2013-509966	JP		2013-03-21	Wright et al.		☒
	13	96/04860	WO		1996-02-22	ZOMED INTERNATIONAL, INC.		☐

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	First Named Inventor	Robert E. Wright
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	Attorney Docket Number	NBUS.001C1C1

	14	96/16606	WO		1996-06-06	VIDAMED, INC.		☐
	15	97/29702	WO		1997-08-21	RITA MEDICAL SYSTEMS, INC.		☐
	16	97/06740	WO		1997-02-27	GOUGH et al.		☐
	17	97/06855	WO		1997-02-27	GOUGH et al.		☐
	18	97/06857	WO		1997-02-27	GOUGH et al.		☐
	19	99/25260	WO		1999-05-27	RITA MEDICAL SYSTEMS, INC.		☐
	20	00/06046	WO		2000-02-10	RADIOTHERAPEUTICS CORPORATION		☐
	21	01/28446	WO		2001-04-26	NEOTHERMIA CORPORATION		☐
	22	01/57655	WO		2001-08-09	BAYLOR COLLEGE OF MEDICINE		☐
	23	02/22032	WO		2002-03-21	RADIOTHERAPEUTICS CORPORATION		☐
	24	02/54941	WO		2002-07-18	RITA MEDICAL SYSTEMS, INC.		☐

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	Attorney Docket Number	NBUS.001C1C1

	25	2006/044105	WO		2006-04-27	BOSTON SCIENTIFIC SCIMED, INC.		☐
	26	2006/104682	WO		2006-10-05	YOUNG		☐
	27	2007/005830	WO		2007-01-11	HALT MEDICAL, INC.		☐
	28	2008/083044	WO		2008-07-10	BOSTON SCIENTIFIC SCIMED, INC.		☐
	29	2011/113943	WO		2011-09-22	VESALIUS MEDICAL TECHNOLOGIES BVBA		☐
	30	2011/146243	WO		2011-11-24	NIMBUS CONCEPTS, LLC		☐

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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.	T5
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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)		
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	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
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	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

[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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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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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:	40777401
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	08:57:52
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	NBUS001C1C1_IDS_Parent_Resubmission_1.pdf	112220 18d4bd1845a890f73a709cf5727807960faa76b	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	Reference_Form_NBUS001C1_1.pdf	1036822 164b321ad6215aa9bf77aeb539208fe4da9a2665	no	11
Warnings:					
Information:					
			Total Files Size (in bytes):	1149042	

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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a listing 76 references. Each of these 76 references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the 76 references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of U.S. patent application publications and U.S. patents are not required. Further, pursuant to 37 C.F.R. § 1.98(d), copies of the listed foreign patent documents are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION

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Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

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DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
(801) 703-1961

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	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	1	BIOMERICS LLC, Statement of Claim, BIOMERICS LLC v DIROS TECHNOLOGY INC & M MEDICAL PTY LTD, NSD438/2019, FEDERAL COURT OF AUSTRALIA, March 22, 2019, 10 pages.
	2	DIROS TECHNOLOGY INC, Statement of Cross Claim, BIOMERICS LLC v DIROS TECHNOLOGY INC & M MEDICAL PTY LTD, NSD438/2019, FEDERAL COURT OF AUSTRALIA, May 13, 2019, 5 pages.
	3	DIROS TECHNOLOGY INC., RF Trident Cannulae, Last Accessed August 20, 2019, available at https://dirostech.com/product-details/rf-tridenttrident-hybrid-cannulae/, 7 pages.
	4	DIROS TECHNOLOGY INC., RF Trident Hybrid Cannulae, Last Accessed August 20, 2019, available at https://dirostech.com/product-details/rf-trident-hybrid-cannulae/, 10 pages.
	5	FOOD AND DRUG ADMINISTRATION, 510(k) Summary for Diros OWL Sterile Single Use Trident R.F. Insulated Cannulae Models DTR and DTRH, July 30, 2015, 11 pages.
	6	AHMED ET AL., Principles of and Advances in Percutaneous Ablation, Radiology, February 2011, pp. 351-369, Vol. 258, No. 2.
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
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	14	IP AUSTRALIA, Patent Examination Report No. 2, Australian Patent Application No. 2014200132, April 8, 2015, 3 pages.	
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	17	CANADIAN INTELLECTUAL PROPERTY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,778,997, June 9, 2017, 7 pages.	☐
	18	CANADIAN INTELLECTUAL PROPERTY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,778,997, May 23, 2019, 5 pages.	☐
	19	INTELLECTUAL PROPERTY INDIA, Examination Report, Indian Patent Application No. 3638/DELNP/2012, March 13, 2019, 5 pages.	☐
	20	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2012-538056, February 2, 2015, 7 pages.	☒
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	23	CANADIAN INTELLECTUAL PROPRETY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,799,505, March 17, 2017, 5 pages.	☐
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	25	CNIPA, NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION, PRC, Office Action, Chinese Patent Application No. 201510151627.1, February 22, 2017, 8 pages.	☐
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	29	INTELLECTUAL PROPERTY INDIA, Examination Report, Indian Patent Application No. 9943/DELNP/2012, July 30, 2019, 6 pages.	☐
	30	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2013-511205, February 9, 2015, 5 pages.	☒
	31	JAPAN PATENT OFFICE, Decision of Rejection, Japanese Patent Application No. 2013-511205, August 10, 2015, 4 pages.	☒
	32	JAPAN PATENT OFFICE, Appeal No. 2015-21839, Notice of Reasons for Rejection, Japanese Patent Application No. 2013-511205, October 3, 2016, 8 pages.	☒
	33	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2015-240011, January 4, 2017, 12 pages.	☒

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	34	KOREAN INTELLECTUAL PROPERTY OFFICE, Notice to Submit Response, Korean Patent Application No. 10-2012-7033363, May 4, 2015, 14 pages.	☒
	35	KOREAN INTELLECTUAL PROPERTY OFFICE, Notice to Submit Response, Korean Patent Application No. 10-2015-7004378, September 25, 2017, 13 pages.	☒
	36	MEXICAN INSTITUTE OF INDUSTRIAL PROPERTY, Requirement 1, Mexican Patent Application No. MX/a/2012/013280, February 17, 2015, 4 pages.	☒
	37	MEXICAN INSTITUTE OF INDUSTRIAL PROPERTY, Requirement 2, Mexican Patent Application No. MX/a/2012/013280, May 27, 2015, 8 pages.	☒
	38	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action, U.S. Patent Application No. 13/101,009, April 6, 2015, 26 pages.	☐
	39	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action, U.S. Patent Application No. 15/092,945, June 4, 2018, 6 pages.	☐
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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.

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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.

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.

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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:	40777417
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	09:01:21
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	Transmittal Letter	NBUS001C1C1_IDS_Parent_Resubmission_2.pdf	112073 ad257ccba647e04d454f286abd4e3cb86fd07710	no	3

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2	Information Disclosure Statement (IDS) Form (SB08)	Reference_Form_NBUS001C1_2.pdf	1036831 ce41d9eecf5948ce9a6b859b99b36b877dbd5a8c	no	7

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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.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a listing 41 references. Each of these 41 references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the 41 references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(d), copies of the listed non-patent literature documents are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION

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Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

Copies of these patent applications, including any pending claims, office actions, notices of allowance, and/or other communications, are available through PALM and/or PAIR. However, if the Examiner so requests, the Applicant will be happy to provide the Examiner with copies of any applications, pending claims, office actions, notices of allowance, communications, or any other documents, at any time.

DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
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Signature	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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

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

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	40777431
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	09:03:32
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	NBUS001C1C1_IDS_Parent_Resubmission_3.pdf	112086 e54328d9a1d9fbdc9b7f30728e75a4187f0e520d	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	Reference_Form_NBUS001C1_3.pdf	1034687 54ed970c0d3bbbe500b7c861719ca77e496b0fcd	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.

Total Files Size (in bytes):	1146773

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a listing four (4) references. Each of these four (4) references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the four (4) references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(d), copies of the listed non-patent literature documents are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 176 of 385

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

Copies of these patent applications, including any pending claims, office actions, notices of allowance, and/or other communications, are available through PALM and/or PAIR. However, if the Examiner so requests, the Applicant will be happy to provide the Examiner with copies of any applications, pending claims, office actions, notices of allowance, communications, or any other documents, at any time.

DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
(801) 703-1961

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 177 of 385

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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	1	IP AUSTRALIA, Examination Report No. 1 for Standard Patent Application for Australian Patent Application No. 2019200358, dated 20 April 2020, 3 pages.
	2	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,778,997, dated 15 May 2020, 3 pages.

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.

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 179 of 385

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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:	40777453
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	09:07:18
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	NBUS001C1C1_IDS_Parent_Resubmission_4.pdf	112057 f19c5e83564accfbcbc1473fa3ce9d16c56ed5a5	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	Reference_Form_NBUS001C1_4.pdf	1034492 7651bac11724dcf5a91074a4633f6a33b6d0c945	no	4

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Information:

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Total Files Size (in bytes):	1146549

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a listing two (2) references. Each of these two (2) references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the two (2) references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(d), copies of the listed non-patent literature documents are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 185 of 385

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

Copies of these patent applications, including any pending claims, office actions, notices of allowance, and/or other communications, are available through PALM and/or PAIR. However, if the Examiner so requests, the Applicant will be happy to provide the Examiner with copies of any applications, pending claims, office actions, notices of allowance, communications, or any other documents, at any time.

DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
(801) 703-1961

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 186 of 385

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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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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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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	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	1	DAVID LAWSON MORRIS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 17 April 2020, 29 pages.
	2	SUSANNE MONICA HANTOS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 21 April 2020, 765 pages.
	3	PETER DARMOS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 21 April 2020, 716 pages.
	4	WILLIAM SAMUAL HUNTER, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 6 April 2020, 158 pages.
	5	DANIEL CHRISTOPHER HIGGS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 6 April 2020, 26 pages.
	6	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,799,505, dated 8 April 2020, 4 pages.
	7	EUROPEAN PATENT OFFICE, Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 11783944.9, dated 28 May 2020, 2 pages.
	8	UNITED STATES PATENT AND TRADEMARK OFFICE, Notice of Allowance for U.S. Patent Application No. 15/092,945, dated 16 March 2020, 16 pages.

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	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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).

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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.

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:	40777491
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	09:11:40
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	NBUS001C1C1_IDS_Parent_Resubmission_5.pdf	112076 a315738fa097351d4bf15ed6007a57f12dec066c	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	Reference_Form_NBUS001C1_5.pdf	1035022 09691dd054dd50ed14449faac9613395b103f9cd	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.

Total Files Size (in bytes):	1147098

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	)	
Application No.:	16/933,995	)	Art Unit: 3794
Filing Date:	July 20, 2020	)	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	)	
Examiner:	Eun Hwa Kim	)	
Confirmation No.:	4367	)	
Customer No.:	148468	)	

INFORMATION DISCLOSURE STATEMENT

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

Commissioner:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a listing eight (8) references. Each of these eight (8) references is of record in U.S. Patent Application No. 15/098,673, titled METHODS AND SYSTEMS FOR RADIO FREQUENCY NEUROTOMY, filed April 14, 2016 ("the Parent Application"), of which the present application is a continuation.

37 CFR § 1.97(b)(1)

The present information disclosure statement is being filed within three months of the filing date of the present national application. Accordingly, the Applicant believes that no fees are required for consideration of the present information disclosure statement, pursuant to 37 C.F.R. § 1.97(b)(1).

References Have Already Been Considered

As the present application is a continuation of the Parent Application, the Applicant believes that, to the extent examination of the present application has begun, the examiner has already considered the eight (8) references identified herein with respect to the present application, pursuant to MPEP § 609.02(II). Accordingly, the Applicant is submitting the present information disclosure statement to ensure these references are ultimately printed on the patent, pursuant to MPEP § 609.2(II).

Copies of All References Omitted

Pursuant to 37 C.F.R. § 1.98(d), copies of the listed non-patent literature documents are not required because (1) the Parent Application has been properly identified in this information disclosure statement and is relied on for an earlier effective filing date under 35 U.S.C. § 120, and (2) all information disclosure statements submitted in the Parent Application comply with 37 C.F.R. § 1.98, paragraphs (a) through (c).

Table of U.S. Patent Applications

The Applicant provides the following table to aid the Examiner during prosecution:

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.001A	12/940,974	2010-11-05	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1	15/098,673 ***(the Parent Application)***	2016-04-14	METHODS AND SYSTEMS FOR SPINAL RADIO FREQUENCY NEUROTOMY
NBUS.001C1C1	16/933,995 ***(the Present Application)***	2020-07-20	METHODS FOR RADIO FREQUENCY NEUROTOMY
NBUS.004A	13/101,009	2011-05-04	SYSTEMS AND METHODS FOR TISSUE ABLATION
NBUS.004C1	15/092,945	2016-04-07	SYSTEMS AND METHODS FOR TISSUE ABLATION

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 194 of 385

Attorney Docket No.	Application No.	Filing Date	Title
NBUS.004C1C1	16/933,811	2020-07-20	NEEDLES AND SYSTEMS FOR RADIOFREQUENCY NEUROTOMY

Copies of these patent applications, including any pending claims, office actions, notices of allowance, and/or other communications, are available through PALM and/or PAIR. However, if the Examiner so requests, the Applicant will be happy to provide the Examiner with copies of any applications, pending claims, office actions, notices of allowance, communications, or any other documents, at any time.

DATED this 7th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
6030 W. Harold Gatty Drive
Salt Lake City, Utah 84116
(801) 703-1961

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 195 of 385

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	16933995
Filing Date	2016-04-14
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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	7918852	B2	2011-04-05	Tullis et al.	
	2	10716618	B2	2020-07-21	Wright et al.	
	3	10736688	B2	2020-08-11	Wright et al.	

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

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060206111	A1	2006-09-14	Young	
	2	20100049192	A1	2010-02-25	Holtz et al.	
	3	20090292259	A1	2009-11-26	Delano et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2016-04-14
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	4	20060095029	A1	2006-05-04	Young et al.	

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

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	2571439	EP	B1	2020-06-24	Stratus Medical, LLC		

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]
	1	LESLIE W. ORGAN, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 5, 2020, 19 pages.	
	2	WILLIAM SAMUEL HUNTER, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 20, 2020, 32 pages.	
	3	MARC ANDREW RUSSO, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 20, 2020, 70 pages.	
	4	PETER DARMOS, Amended Statement of Cross Claim Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated June 5, 2020, 32 pages.	

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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	16933995
	Filing Date	2016-04-14
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

[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	16933995
	Filing Date	2016-04-14
	First Named Inventor	Robert E. Wright
	Art Unit	3794
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Signature	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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Electronic Acknowledgement Receipt

EFS ID:	40777533
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	09:17:56
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_NBUS001C1C1.pdf	1034992 488a50276ed3f5213b45c14b0293b25d9f8da529	no	5

Warnings:

Information:					
2	Foreign Reference	EP2571439B1.pdf	3971474 df61de1a73251fac8c39d53e0e165ad123403856	no	78
Warnings:					
Information:					
3	Non Patent Literature	Organ.pdf	738926 288ad4ac5e4b16b22cfa88e3becf679dd87aa237	no	19
Warnings:					
Information:					
4	Non Patent Literature	Hunter.pdf	481848 88d4724555e2988c3af1c5ef84187198c8e1784c	no	32
Warnings:					
Information:					
5	Non Patent Literature	Russo.pdf	1811383 b23ef14abcc591ae875ec7dd36d3ec87ef9a679c	no	70
Warnings:					
Information:					
6	Non Patent Literature	Amended_Statement_of_Cross_Claim.pdf	5948379 6d9335a991d4830c6922596d9ab0b0d05a031c2d	no	7
Warnings:					
Information:					
		Total Files Size (in bytes):	13987002		

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New Applications Under 35 U.S.C. 111

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PTO/AIA/80 (07-17)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

[X] Practitioners associated with Customer Number: 148468

OR

[ ] Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

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

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

[X] The address associated with Customer Number: 148468

OR

[ ]

Firm or individual name		
Address		
City	State	Zip
Country		
Telephone	Email	

Assignee name and address:
Stratus Medical, LLC
8030 W. Harold Gatty Drive, Salt Lake City, Utah 84116

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

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

Signature	Date 2/20/2020
Name Bret Boudousquie	Telephone 801-355-3044
Title Chief Executive Officer	

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 C.F.R. § 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.

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Stratus Medical, LLC

Application No./Patent No.: 16/933,995 Filed/Issue Date: July 20, 2020

Titled: METHODS FOR RADIO FREQUENCY NEUROTOMY

Stratus Medical, LLC, a limited liability company

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

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

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

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

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

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

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

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

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

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

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

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

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

1. From: Robert E. Wright and Scott A. Brandt To: Nimbus Concepts, LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 039717, Frame 0072, or for which a copy thereof is attached.

2. From: Nimbus Concepts, LLC To: Biomerics, LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 051813, Frame 0965, or for which a copy thereof is attached.

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

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Petitioner's Exhibit 1008
Avanos v. Stratus
Page 206 of 385

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: Biomerics, LLC To: Stratus Medical, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 052837, Frame 0846, or for which a copy thereof is attached.

4. From: _____ To: _____

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

5. From: _____ To: _____

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

6. From: _____ To: _____

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

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

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

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

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

/Daniel C. Higgs/	October 7, 2020
Signature	Date
Daniel C. Higgs	55,265
Printed or Typed Name	Title or Registration Number

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Electronic Acknowledgement Receipt

EFS ID:	40782559
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	14:32:42
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	Power of Attorney	General_POA_Stratus_Executed.pdf	3310950 0f6994c6c0f46d94bb07ea56e2b378faa1c20d00	no	2

Warnings:

Information:					
2	Assignee showing of ownership per 37 CFR 3.73	Statement_3_73_c.pdf	120726 36db867e9491111996fd69ffee810a91ff7ef264	no	3
Warnings:					
Information:					
			Total Files Size (in bytes):	3431676	

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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TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION

Docket Number (Optional): NBUS.001C1C1

In re Application of: Robert E. Wright et al.

Application No.: 16/933,995

Filed: July 20, 2020

For: METHODS FOR RADIO FREQUENCY ABLATION

The applicant, Stratus Medical, LLC, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending **reference** Application Number 16/933,811, filed, July 20, 2020, as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the **reference** application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

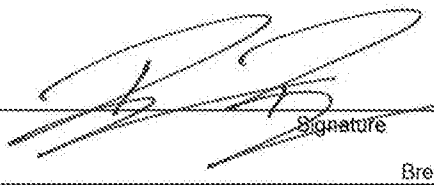
In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said **reference** application, "as the term of any patent granted on said **reference** application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** application," in the event that: any such patent granted on the pending **reference** application expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1. ☑ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☐ The undersigned is an attorney or agent of record. Reg. No. _____



Signature — October 7, 2020 — Date

Bret Boudousquie
Typed or printed name

Chief Executive Officer — Title

(801) 355-2705 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT

Docket Number (Optional): NBUS.001C1C1

In re Application of: Robert E. Wright et al.

Application No.: 16/933,995

Filed: July 20, 2020

For: METHODS FOR RADIO FREQUENCY ABLATION

The applicant, Stratus Medical, LLC, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 10,716,618 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

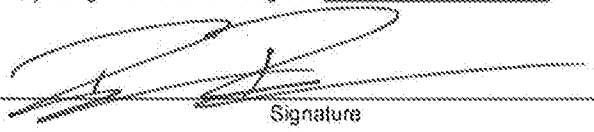
- expires for failure to pay a maintenance fee;
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Bret Boudousquie
Typed or printed name

Chief Executive Officer — Title

(801) 355-2705 — Telephone Number

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) NBUS.001C1C1

In re Application of: Robert E. Wright et al.

Application No.: 16/933,995

Filed: July 20, 2020

For: METHODS FOR RADIO FREQUENCY ABLATION

The applicant, Stratus Medical, LLC, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 10,736,688 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

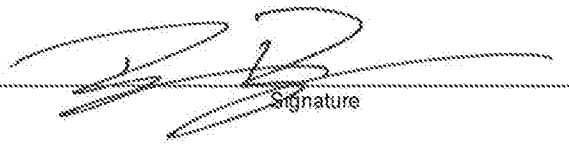
expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☑ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☐ The undersigned is an attorney or agent of record. Reg. No. _____



Signature — October 7, 2020 — Date

Bret Boudousquie
Typed or printed name

Chief Executive Officer — Title

(801) 355-2705 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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 Patent Application Fee Transmittal

Application Number:	16933995
Filing Date:	20-Jul-2020
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Filer:	Daniel Christopher Higgs
Attorney Docket Number:	NBUS.001C1C1

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($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	3	170	510
		Total in USD ($)		**510**

Electronic Acknowledgement Receipt

EFS ID:	40782982
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	07-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	14:53:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$510
RAM confirmation Number	E202007E53568634
Deposit Account	602176
Authorized User	Daniel Higgs

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	Assignee showing of ownership per 37 CFR 3.73	Statement_3_73_c.pdf	120726 36db867e9491111996fd69ffee810a91ff7ef264	no	3
Warnings:					
Information:					
2	Terminal Disclaimer Filed	TD_App_16_933811.pdf	1340333 1ca32dec3a0937d29645040958cad0c748cc6c01	no	2
Warnings:					
Information:					
3	Terminal Disclaimer Filed	TD_Pat_No_10716618.pdf	1291579 c87bbbaa6f783121a1b4c44de68d322036e958ed	no	2
Warnings:					
Information:					
4	Terminal Disclaimer Filed	TD_Pat_No_10736688.pdf	1290751 7e3b43d8279963edb0c59beb240cfcdd29d152d4	no	2
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30578 99c16d2526d753b89e9620724eda281a86d3661f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	4073967		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Stratus Medical, LLC

Application No./Patent No.: 16/933,995 Filed/Issue Date: July 20, 2020

Titled: METHODS FOR RADIO FREQUENCY NEUROTOMY

Stratus Medical, LLC, a limited liability company

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

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

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

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

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

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

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

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

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

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

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

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

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

1. From: Robert E. Wright and Scott A. Brandt To: Nimbus Concepts, LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 039717, Frame 0072, or for which a copy thereof is attached.

2. From: Nimbus Concepts, LLC To: Biomerics, LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 051813, Frame 0965, or for which a copy thereof is attached.

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

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

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 222 of 385

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: Biomerics, LLC To: Stratus Medical, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 052837, Frame 0846, or for which a copy thereof is attached.

4. From: _____ To: _____

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

5. From: _____ To: _____

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

6. From: _____ To: _____

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

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

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

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

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

/Daniel C. Higgs/	October 7, 2020
Signature	Date
Daniel C. Higgs	55,265
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/933,995 *	16/933,995	Wright et al.	
	Examiner	**Art Unit**	
	KIM, EUN HWA	3794	

Document Code - DISQ	**Internal Document - DO NOT MAIL**

TERMINAL DISCLAIMER	☑ APPROVED	☐ DISAPPROVED
Date Filed: **07 October 2020**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

3/Tds all approved.
/LAWANA R HIXON/

Technology Center: OPLC

Telephone: (571)272-6074

_____

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 225 of 385

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1

CONFIRMATION NO. 4367

148468
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

POA ACCEPTANCE LETTER

OC000000120527865

Date Mailed: 10/09/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/07/2020.

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

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

/dtdinh/

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 226 of 385

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

148468 7590 10/15/2020
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

EXAMINER
KIM, EUN HWA

ART UNIT	PAPER NUMBER
3794	

DATE MAILED: 10/15/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

TITLE OF INVENTION: METHODS FOR RADIO FREQUENCY NEUROTOMY

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	01/15/2021

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

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)

148468 7590 10/15/2020
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

TITLE OF INVENTION: METHODS FOR RADIO FREQUENCY NEUROTOMY

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	01/15/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
KIM, EUN HWA	3794	606-034000

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

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

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

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

1 _____
2 _____
3 _____

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

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

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

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Petitioner's Exhibit 1008
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

148468 7590 10/15/2020

Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

EXAMINER	
KIM, EUN HWA	

ART UNIT	PAPER NUMBER
3794	

DATE MAILED: 10/15/2020

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

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

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

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

Notice of Allowability	Application No. 16/933,995	Applicant(s) Wright et al.	
	Examiner EUNHWA KIM	Art Unit 3794	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 claims filed on 9/2/2020.
   ☐ 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 3-21 and 23-32 . 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. 20201005.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/EUN HWA KIM/
Primary Examiner, Art Unit 3794

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EXAMINER'S AMENDMENT

Terminal Disclaimer

1. The terminal disclaimer filed on October 8, 2020 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration dates of **U.S. Pat. No. 10,736,688, U.S. Pat. No. 10,716,618 and co-pending 16/933,811** have been reviewed and are accepted. The terminal disclaimers have been recorded.

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

Authorization for this examiner's amendment was given in an interview with **Dan Higgs on October 7, 2020.**

3. The application has been amended as follows:

4. Claim 10, ln. 3: "a monopolar electrode" is changed to –the monopolar electrode--;

5. Claim 11, ln. 1: "wherein the tip comprises" is changed to –wherein the conductive portion comprises--;

6. Claim 22: cancelled.

7. Claim 23, lns. 2-3: "a monopolar electrode." Is changed to –the monopolar electrode.--;

8. Claim 25, ln. 3: "a monopolar electrode." Is changed to –the monopolar electrode.--; and

9. Claim 26, ln. 2: "a conductive portion of the needle at a distal end of the needle" is changed to –the conductive portion of the needle--.

Reasons for Allowance

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

11. During the search of the prior art, various prior arts were found to be relevant to the claimed method.

12. Young (U.S. PGPub. No. 2006/0084965, cited in IDS) discloses a method for inserting a needle into a patient (see Fig. 7A), moving a filament to a deployed position (moving array 26 in see Fig. 7B); inserting a radiofrequency probe (shaft 20 composed of a metal, [0024]) into the lumen of the needle. However, Young fails to disclose the method step of inserting a radiofrequency probe into the lumen of the needle such that the RF probe contacts a conductive portion of the needle at a distal end of the needle (Fig. 6 illustrates that the shaft does not come in contact with the electrode portion of the needle 92). Furthermore, Young explicitly discloses that the filaments and the needle electrodes operate in bipolar configuration and thus fail to teach operating as a monopolar electrode ([0032]: "the array 30 of electrodes 26 and the operative electrode 92 are used to deliver RF current in a *bipolar fashion*...").

13. Similarly, Young '029 (U.S. PGPub. No. 2006/0095029, cited in IDS) discloses a method for inserting a needle into a patient (see Fig. 14A) and moving a filament to a deployed position (see Fig. 14B). However, Young fails to disclose inserting a radiofrequency probe into the lumen of the needle such that the RF probe contacts a conductive portion of the needle at a distal end of the needle.

14. Edwards et al. (U.S. Pat. No. 5,599,346, cited in IDS) discloses a method comprising: inserting a needle into a patient (RF treatment apparatus 10 including needle electrode 16 is introduced through a body, see col. 6, ln. 39-67), the needle comprising: an elongate member a piercing tip at a distal end of the elongate member; a lumen within the elongate member (see Fig.

2 for the claimed elements); inserting a radiofrequency probe into the lumen of the needle (Fig. 2 illustrates that the probe 15 is inserted into the lumen of needle 16). However, there would be no motivation to modify the method of Edwards such that the radiofrequency probe contacts a conductive portion of the needle to thereby establish an electrically conductive path from the radiofrequency probe to the filament; and operating the radiofrequency probe, the tip, and the filament as a monopolar electrode. Edwards specifically discloses that the arrangement of RF probe 14 and needle electrode 16 operates in *a bipolar mode* (col. 7, lns. 5-24: "Ablative or hyperthermia treatment begins when two electrodes are positioned closely enough to effect bipolar treatment…"). Shorting the RF probe and the needle electrode of Edwards as claimed would teach away from the intended use for bipolar treatment.

15. Tullis et al. (hereinafter 'Tullis', U.S. Pat. No. 7,918,852, cited in IDS) discloses a method comprising: inserting a needle into a patient (needle 28 in Fig. 2), the needle comprising: an elongate member; a piercing tip at a distal end of the elongate member; a lumen within the elongate member (see Fig. 2 for the claimed features); inserting a radiofrequency probe into the lumen of the needle such that the radiofrequency probe (see Fig. 5; RF probe inserted into needle 28). However, Similar to Edwards, Tullis only teaches that the proximal portion of the RF probe (electrical connector 140 in assembly 36 in Figs. 10 and 12) establishes electrical connection with the proximal portion of the needle (terminal 86 of the cannula 28 abuts connector 140 of the assembly as shown in Figs. 10 & 12). While Tullis does disclose an additional electrical connection between the inner tube (48 in Fig. 15) and the electrically conductive surface of the RF probe (col. 15, ln. 47-58), it is only used for *a bipolar configuration* (col. 10, ln. col. 15, ln. 40-48; see Fig. 15 wherein the conductive path 71 illustrates the current path between active electrode 62 and second electrode 68 as shown in Fig. 15). As such, there would be no

motivation to modify the insulated RF probe (insulative shell 122 in Fig. 17) intended to be used for monopolar configuration to be conductive as doing so teaches away from its intended use.

In combination, Young, Edwards, Tullis, whether alone or in combination with another prior art fails to disclose the method steps as claimed in independent claims 3 and 24.

Accordingly, claims 4-23 and 25-32 are allowed as being dependent on independent claim 3 or 24.

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."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUNHWA KIM whose telephone number is (571)270-1265. The examiner can normally be reached on 9AM-5:30PM.

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, JOSEPH STOKLOSA can be reached on (571) 272-1213. 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 https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EUN HWA KIM/
Primary Examiner, Art Unit 3794
10/8/2020

Examiner-Initiated Interview Summary	**Application No.** 16/933,995	**Applicant(s)** Wright et al.	
	Examiner EUNHWA KIM	**Art Unit** 3794	**AIA (FITF) Status** No

All participants (applicant, applicant's representative, PTO personnel):

(1) EUNHWA KIM. (3) _____.

(2) Dan Higgs. (4) _____.

Date of Interview: 06 October 2020.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: _____.

Issues Discussed ☐ 101 ☐ 112 ☐ 102 ☐ 103 ☑ Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: _____.

Identification of prior art discussed: _____.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/EUN HWA KIM/ Primary Examiner, Art Unit 3794	

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Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: An interview was conducted to place the case in condition for allowance.

There was a discussion for support of a single filament. Applicant explained that support can be found in paragraphs [0016], [0035], [0047] and Fig. 11C (in published PG publication of a parent case). Examiner agreed that there was support for a single filament.

Claim amendments agreed upon can be found in NOA.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/933,995	Wright et al.
	Examiner	Art Unit
	EUNHWA KIM	3794

CPC - Searched*		
Symbol	Date	Examiner
A61B18/1477; A61B2018/00434,1253,00577,1467; A61B2218/001,002,003	10/07/2020	EK

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
Inventor and Assignee Search	10/07/2020	EK
Text Search (see EAST search history printout)	10/07/2020	EK

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
see EAST search history printout	see EAST search history printout	10/07/2020	EK

/EUN HWA KIM/ Primary Examiner, Art Unit 3794	

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/933,995	Wright et al.
	Examiner	**Art Unit**
	EUNHWA KIM	3794

CPC						
Symbol					**Type**	**Version**
A61B	/	18	/	1477	F	2013-01-01
A61B	/	18	/	1206	I	2013-01-01
A61B	/	2018	/	00434	A	2013-01-01
A61B	/	2018	/	00821	A	2013-01-01
A61B	/	2090	/	3762	A	2016-02-01
A61B	/	2018	/	00875	A	2013-01-01
A61B	/	2018	/	1467	A	2013-01-01
A61B	/	2090	/	376	A	2016-02-01
A61B	/	2018	/	00577	A	2013-01-01
A61B	/	2018	/	00642	A	2013-01-01
A61B	/	2018	/	00791	A	2013-01-01
A61B	/	2018	/	1253	A	2013-01-01
A61B	/	2018	/	126	A	2013-01-01
A61B	/	2018	/	00595	A	2013-01-01

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	29	
/EUN HWA KIM/ Primary Examiner, Art Unit 3794	06 October 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	3	1

U.S. Patent and Trademark Office

Part of Paper No.: 20201005

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/933,995	Wright et al.
	Examiner	**Art Unit**
	EUNHWA KIM	3794

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A61B	/	18	/	14

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 29	
/EUN HWA KIM/ Primary Examiner, Art Unit 3794 (Primary Examiner) 06 October 2020 (Date)	O.G. Print Claim(s) 3	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20201005

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/933,995	Wright et al.
	Examiner	**Art Unit**
	EUNHWA KIM	3794

☑ 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

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	29	
/EUN HWA KIM/ Primary Examiner, Art Unit 3794	06 October 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	3	1

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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

U.S.PATENTS Remove

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

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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]
	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]

Petitioner's Exhibit 1008
Avanos v. Stratus

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

	1	DAVID LAWSON MORRIS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 17 April 2020, 29 pages.
	2	SUSANNE MONICA HANTOS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 21 April 2020, 765 pages.
	3	PETER DARMOS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 21 April 2020, 716 pages.
	4	WILLIAM SAMUAL HUNTER, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 6 April 2020, 158 pages.
	5	DANIEL CHRISTOPHER HIGGS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated 6 April 2020, 26 pages.
	6	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,799,505, dated 8 April 2020, 4 pages.
	7	EUROPEAN PATENT OFFICE, Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 11783944.9, dated 28 May 2020, 2 pages.
	8	UNITED STATES PATENT AND TRADEMARK OFFICE, Notice of Allowance for U.S. Patent Application No. 15/092,945, dated 16 March 2020, 16 pages.

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EXAMINER SIGNATURE

Examiner Signature	/EUN HWA KIM/	Date Considered	10/07/2020

*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.

Petitioner's Exhibit 1008
Avanos v. Stratus

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(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

CERTIFICATION STATEMENT

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

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OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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Avanos v. Stratus
Page 246 of 385

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

PTO/SB/08a (02-18)
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Attorney Docket Number	NBUS.001C1C1

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Avanos v. Stratus

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	1	BIOMERICS LLC, Statement of Claim, BIOMERICS LLC v DIROS TECHNOLOGY INC & M MEDICAL PTY LTD, NSD438/2019, FEDERAL COURT OF AUSTRALIA, March 22, 2019, 10 pages.
	2	DIROS TECHNOLOGY INC, Statement of Cross Claim, BIOMERICS LLC v DIROS TECHNOLOGY INC & M MEDICAL PTY LTD, NSD438/2019, FEDERAL COURT OF AUSTRALIA, May 13, 2019, 5 pages.
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	4	DIROS TECHNOLOGY INC., RF Trident Hybrid Cannulae, Last Accessed August 20, 2019, available at https://dirostech.com/product-details/rf-trident-hybrid-cannulae/, 10 pages.
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	9	HAEMMERICH ET AL., Large-Volume Radiofrequency Ablation of ex Vivo Bovine Liver with Multiple Cooled Cluster Electrodes, Radiology, February 2005, pp. 563-568, Vol. 234, No. 2.
	10	LAESEKE ET AL., Multiple-Electrode RF Ablation Creates Confluent Areas of Necrosis: Results in in vivo Porcine Liver, Radiology, October 2006, pp. 116-124.
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	12	SCHARF ET AL., Ablation of Persistent Atrial Fibrillation Using Multielectrode Catheters and Duty-Cycled Radiofrequency Energy, Journal of the American College of Cardiology, October 6, 2009, pp. 1450-1456, Vol. 54, No. 15.	
	13	SHIRATO ET AL., Small Hepatocellular Carcinoma: Therapeutic Effectiveness of Percutaneous Radio Frequency Ablation Therapy With a LeVeen Needle Electrode, American Institute of Ultrasound in Medicine, 2002, pp. 67-76.	
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	17	CANADIAN INTELLECTUAL PROPERTY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,778,997, June 9, 2017, 7 pages.	☐
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	19	INTELLECTUAL PROPERTY INDIA, Examination Report, Indian Patent Application No. 3638/DELNP/2012, March 13, 2019, 5 pages.	☐
	20	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2012-538056, February 2, 2015, 7 pages.	☒
	21	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2015-215570, October 24, 2016, 15 pages.	☒
	22	IP AUSTRALIA, Patent Examination Report No. 1, Australian Patent Application No. 2014200126, May 27, 2016, 6 pages.	☐

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	23	CANADIAN INTELLECTUAL PROPRETY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,799,505, March 17, 2017, 5 pages.	☐
	24	CANADIAN INTELLECTUAL PROPRETY OFFICE, Notification of Requisition by the Examiner, Canadian Patent Application No. 2,799,505, April 15, 2019, 10 pages.	☐
	25	CNIPA, NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION, PRC, Office Action, Chinese Patent Application No. 201510151627.1, February 22, 2017, 8 pages.	☐
	26	CNIPA, NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION, PRC, Office Action, Chinese Patent Application No. 201510148998.4, March 2, 2017, 10 pages.	☐
	27	EUROPEAN PATENT OFFICE, Communication Pursuant to Article 94(3) EPC, European Patent Application No. 11 783 944.9 - 1124, February 28, 2018, 4 pages.	☐
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	29	INTELLECTUAL PROPERTY INDIA, Examination Report, Indian Patent Application No. 9943/DELNP/2012, July 30, 2019, 6 pages.	☐
	30	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2013-511205, February 9, 2015, 5 pages.	☒
	31	JAPAN PATENT OFFICE, Decision of Rejection, Japanese Patent Application No. 2013-511205, August 10, 2015, 4 pages.	☒
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	33	JAPAN PATENT OFFICE, Notice of Reasons for Rejection, Japanese Patent Application No. 2015-240011, January 4, 2017, 12 pages.	☒

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	34	KOREAN INTELLECTUAL PROPERTY OFFICE, Notice to Submit Response, Korean Patent Application No. 10-2012-7033363, May 4, 2015, 14 pages.	☒
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	36	MEXICAN INSTITUTE OF INDUSTRIAL PROPERTY, Requirement 1, Mexican Patent Application No. MX/a/2012/013280, February 17, 2015, 4 pages.	☒
	37	MEXICAN INSTITUTE OF INDUSTRIAL PROPERTY, Requirement 2, Mexican Patent Application No. MX/a/2012/013280, May 27, 2015, 8 pages.	☒
	38	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action, U.S. Patent Application No. 13/101,009, April 6, 2015, 26 pages.	☐
	39	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action, U.S. Patent Application No. 15/092,945, June 4, 2018, 6 pages.	☐
	40	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action, U.S. Patent Application No. 15/092,945, March 14, 2019, 15 pages.	☐
	41	UNITED STATES PATENT AND TRADEMARK OFFICE, Applicant-Initiated Interview Summary, U.S. Patent Application No. 15/092,945, August 27, 2019, 4 pages.	☐

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	689	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2020/10/07 15:29
L2	28	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2020/10/07 15:29
L3	711	L1 L2	US-PGPUB; USPAT	OR	ON	2020/10/07 15:29
L4	2,174	a61b2018/00434.cpc.	US-PGPUB; USPAT	OR	ON	2020/10/07 15:38
L5	1,922	a61b2018/1253.cpc.	US-PGPUB; USPAT	OR	ON	2020/10/07 15:38
L6	3,975	4 5	US-PGPUB; USPAT	OR	ON	2020/10/07 15:39
L7	2,574	a61b2018/1467.cpc.	US-PGPUB; USPAT	OR	ON	2020/10/07 15:39
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S1	5,986	606/41,44.ccls.	US-PGPUB; USPAT	OR	ON	2014/01/29 10:14
S2	501	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:32
S3	110	((ROBERT) near2 (WRIGHT)).INV.	EPO; JPO; DERWENT	OR	ON	2014/01/29 11:33
S4	22	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:33
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			DERWENT			
S6	3	S2 and "606".CLAS.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:33
S7	0	S3 and "606".CLAS.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:33
S8	2	S4 and "606".CLAS.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:34
S9	0	S5 and "606".CLAS.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:34
S10	373	US-1234567-$.DID. OR US-D372086-$.DID. OR US-4011872-$.DID. OR US-4206761-$.DID. OR US-4206762-$.DID. OR US-4281667-$.DID. OR US-4353371-$.DID. OR US-4375220-$.DID. OR US-4378809-$.DID. OR US-4385636-$.DID. OR US-4411266-$.DID. OR US-4565200-$.DID. OR US-4573980-$.DID. OR US-4583538-$.DID. OR US-4593703-$.DID. OR US-4618978-$.DID. OR US-4646752-$.DID. OR US-4653508-$.DID. OR US-4660568-$.DID. OR US-4676255-$.DID. OR US-4698207-$.DID. OR US-4787886-$.DID. OR US-4796615-$.DID. OR US-4827927-$.DID. OR US-4838265-$.DID. OR US-4886506-$.DID. OR US-4907589-$.DID. OR US-4966597-$.DID. OR US-5010897-$.DID. OR US-5160337-$.DID. OR US-5217457-$.DID. OR US-5230623-$.DID. OR US-5233515-$.DID. OR US-5244462-$.DID. OR US-5257630-$.DID. OR US-5291896-$.DID. OR US-5304114-$.DID. OR US-5304115-$.DID. OR US-5312329-$.DID. OR US-5312391-$.DID. OR US-5318013-$.DID. OR US-5324255-$.DID. OR US-5334183-$.DID. OR US-5342292-$.DID. OR US-5370645-$.DID. OR US-5370675-$.DID. OR US-5372596-$.DID. OR US-5377685-$.DID. OR US-5397301-$.DID. OR US-5401272-$.DID. OR US-5421923-$.DID. OR US-5422567-$.DID. OR US-5423809-$.DID. OR US-5433739-$.DID. OR US-5447417-$.DID. OR US-5458597-$.DID. OR US-5472441-$.DID. OR US-5472442-$.DID. OR US-5474057-$.DID. OR US-5484398-$.DID. OR US-5496312-$.DID. OR US-5507743-$.DID. OR US-5511564-$.DID. OR US-5514129-$.DID. OR US-5536267-$.DID. OR US-5541376-$.DID. OR US-5560358-$.DID. OR US-5562703-$.DID. OR US-5571147-$.DID. OR US-5580665-$.DID. OR US-5599345-$.DID. OR US-5599346-$.DID. OR US-5611709-	US-PGPUB; USPAT	OR	ON	2014/01/29 11:37

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S11	4	US-1234567-$.DID. OR US-5507802-$.DID. OR US-7270661-$.DID. OR US-20070287996-$.DID.	US-PGPUB; USPAT	OR	ON	2014/01/29 11:38
S12	20	(US-20040260282-$ or US-20050101950-$ or US-20060189972-$).did. or (US-2994324-$ or US-5599346-$ or US-5683384-$ or US-5728143-$ or US-5735847-$ or US-5782827-$ or US-5800484-$ or US-5810804-$ or US-5863290-$ or US-5913855-$ or US-5925042-$ or US-5928229-$ or US-5951547-$ or US-6053937-$ or US-6092528-$ or US-6254598-$ or US-6958062-$).did.	US-PGPUB; USPAT	OR	ON	2014/01/29 12:00
S13	379	S10 or S11 S12	US-PGPUB; USPAT	OR	ON	2014/01/29 12:00
S14	20	S13 and S12	US-PGPUB; USPAT	OR	ON	2014/01/29 12:19
S15	379	S13 S12	US-PGPUB; USPAT	OR	ON	2014/01/29 12:19

S16	23	S15 and (detent)	US-PGPUB; USPAT	OR	ON	2014/01/29 12:19
S17	100, 218	"606"/$.ccls.	US-PGPUB; USPAT	OR	ON	2014/01/29 12:21
S18	136	neurotomy	US-PGPUB; USPAT	OR	ON	2014/01/29 12:21
S19	5	"7108696".pn. "7357798".pn. "20090221998".pgnr. "20060217705".pgnr. "200620200121".pgnr. "20090024124".pgnr.	US-PGPUB; USPAT	OR	ON	2014/01/29 12:46
S20	88	US-8292822-$.DID. OR US-5540778-$.DID. OR US-5672375-$.DID. OR US-3918455-$.DID. OR US-4341094-$.DID. OR US-5232442-$.DID. OR US-5304141-$.DID. OR US-5379900-$.DID. OR US-5562685-$.DID. OR US-5709692-$.DID. OR US-20050059964-$.DID. OR US-5226912-$.DID. OR US-5269808-$.DID. OR US-5425746-$.DID. OR US-5437726-$.DID. OR US-5569302-$.DID. OR US-5250247-$.DID. OR US-5507777-$.DID. OR US-5649962-$.DID. OR US-5374278-$.DID. OR US-5639506-$.DID. OR US-5643628-$.DID. OR US-5891247-$.DID. OR US-6031018-$.DID. OR US-6053086-$.DID. OR US-4124153-$.DID. OR US-4282637-$.DID. OR US-4457128-$.DID. OR US-4501133-$.DID. OR US-4907741-$.DID. OR US-5503092-$.DID. OR US-5532657-$.DID. OR US-5648003-$.DID. OR US-5683025-$.DID. OR US-5891166-$.DID. OR US-5897044-$.DID. OR US-5954242-$.DID. OR US-5991957-$.DID. OR US-6035916-$.DID. OR US-6051180-$.DID. OR US-6126676-$.DID. OR US-6270464-$.DID. OR US-6402770-$.DID. OR US-6536482-$.DID. OR US-6699205-$.DID. OR US-6730042-$.DID. OR US-6739024-$.DID. OR US-7761964-$.DID.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/02/11 12:24
S21	75	US-5769822-$.DID. OR US-20050288759-$.DID. OR US-4998661-$.DID. OR US-5934275-$.DID. OR US-5133738-$.DID. OR US-5226912-$.DID. OR US-5503092-$.DID. OR US-6536482-$.DID. OR US-20060106405-$.DID. OR US-6803013-$.DID. OR US-20020176734-$.DID. OR US-20070215543-$.DID. OR US-5749846-$.DID. OR US-8206300-$.DID. OR US-8414509-$.DID. OR US-20050004563-$.DID. OR US-20050222565-$.DID. OR US-20050283148-$.DID. OR US-20090131790-$.DID. OR US-3840011-$.DID. OR US-4191054-$.DID. OR US-4269387-$.DID. OR US-4553687-$.DID. OR US-4710176-$.DID. OR US-4755173-$.DID. OR US-4808168-	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/02/11 12:24

		$.DID. OR US-4832690-$.DID. OR US-4833824-$.DID. OR US-5112311-$.DID. OR US-5154698-$.DID. OR US-5239773-$.DID. OR US-5265606-$.DID. OR US-5487739-$.DID. OR US-5542268-$.DID. OR US-5607003-$.DID. OR US-5687739-$.DID. OR US-5713872-$.DID. OR US-5743882-$.DID.				
S22	50	("20110213356" "20110288540" "5540778" "5672375" "3918455" "4341094" "5232442" "5304141" "5379900" "5562685" "5709692" "20050059964" "5226912" "5269808" "5425746" "5437726" "5569302" "5250247" "5507777" "5649962" "5374278" "5639506" "5643628" "5891247" "6031018" "6053086" "4124153" "4282637" "4457128" "4501133" "4907741" "5503092" "5532657" "5648003" "5683025" "5891166" "5897044" "5954242" "5991957" "6035916" "6051180" "6126676" "6270464" "6402770" "6536482" "6699205" "6730042" "6739024" "7761964" "8292822").pn.	US-PGPUB; USPAT	OR	ON	2014/02/11 12:26
S23	85	S20 S21 S22	US-PGPUB; USPAT	OR	ON	2014/02/11 12:26
S24	85	S20 S21 S22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/11 12:26
S25	1	"20090221998"	DERWENT	OR	ON	2014/02/11 12:39
S26	259,590	a61b2018/0016, "00166", "00196", "00208", "00273", "00279", "0091", "00434", "0044", "1425", "143", "1432", "1465" "1475".cpc.	DERWENT	OR	ON	2014/02/11 12:56
S27	891	a61b2018/0016,00166,00196,00208,00273,00279,0091,00434,0044,1425,143,1432,1465,1475.cpc.	DERWENT	OR	ON	2014/02/11 12:58
S28	5,217	a61b2018/0016,00166,00196,00208,00273,00279,0091,00434,0044,1425,143,1432,1465,1475.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/11 12:58

S29	3,226	S28 and @py<"2009"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/11 13:00
S30	3	"7108696".pn. "7357798".pn. "20060217705".pgnr. "7108696".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 09:58
S31	3	"7108696".pn. "7357798".pn. "20060217705".pgnr.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 09:59
S32	2	"7270661".pn. "5507802.pn" "20070287996".pgnr.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:01
S33	3	"7270661".pn. "5507802".pn. "20070287996".pgnr.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:02
S34	50	(actuator actuate actuating) same (helical adj track thread) same (filament electrode) same (hub)	US-PGPUB; USPAT; USOC	OR	ON	2014/02/12 10:34

			R; EPO; JPO			
S35	12	(actuator actuate actuating) same (helical adj track thread) same (filament electrode) same (hub) same (advanced advancing deployed deploying deploy retracted retracting retract)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:38
S37	316	(actuator actuate actuating) same (helical adj track thread) same (advanced advancing deployed deploying deploy retracted retracting retract) near3 (filament stylet anchor element)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:41
S38	274,031	("600" "606" "607").CLAS.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:45
S39	13,082	S38 and filament	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:45
S40	3,630	S39 and (actuate actuator actuating)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:46

S41	6	S39 and (hub with thread) and (actuat$3 with thread)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 10:47
S42	2,598	S39 and (rotate rotat$4) same (deployment deploy retract retract$4 advance advancing)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 11:33
S43	251	S39 and (rotate rotat$4) same (deployment deploy retract retract$4 advance advancing) same (filament)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 11:34
S44	1	"5964756".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 11:55
S45	110	S39 and (rotate rotat$4) with (actuate actuating actuated) and (deployment deploy retract retract$4 advance advancing) same (filament)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/02/12 12:00
S46	52	(US-20040260282-$ or US-20050101950-$ or US-20060189972-$ or US-20060206133-$ or US-20060206132-$ or US-20060206131-$ or US-20090221998-$ or US-20090024124-$ or US-20060217705-$ or US-20010018586-$ or US-20010031941-$ or US-20060206130-$ or US-20060206129-$ or US-20060206111-$ or US-20070016183-$	US-PGPUB; USPAT	OR	ON	2014/02/12 14:02

		or US-20070077230-$ or US-20080161804-$ or US-20070287996-$ or US-20090105640-$ or US-20060229645-$).did. or (US-2994324-$ or US-5599346-$ or US-5683384-$ or US-5728143-$ or US-5735847-$ or US-5782827-$ or US-5800484-$ or US-5810804-$ or US-5863290-$ or US-5913855-$ or US-5925042-$ or US-5928229-$ or US-5951547-$ or US-6053937-$ or US-6092528-$ or US-6254598-$ or US-6958062-$ or US-6132425-$ or US-6129726-$ or US-5672173-$ or US-7108696-$ or US-7357798-$ or US-5687739-$ or US-5749846-$ or US-2022065-$ or US-5995875-$).did. or (US-6123084-$ or US-6245070-$ or US-7198625-$ or US-7270661-$ or US-5507802-$ or US-6638275-$).did.				
S47	49	S46 and (filament antenna electrode)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:04
S48	37,500	S46 and (filament antenna electrode) and (single near2 wire) or ("same" near2 wire)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:05
S49	3	S46 and (filament antenna electrode) and ((single near2 wire) or ("same" near2 wire))	US-PGPUB; USPAT	OR	ON	2014/02/12 14:05
S50	4,674	S38 and (filament antenna electrode) and ((single near2 wire) or ("same" near2 wire))	US-PGPUB; USPAT	OR	ON	2014/02/12 14:06
S51	1,425	S38 and (filament antenna electrode) with ((single near2 wire) or ("same" near2 wire))	US-PGPUB; USPAT	OR	ON	2014/02/12 14:07
S52	2	S38 and (filament antenna electrode) with ((single near2 wire) or ("same" near2 wire)) with (actuator actuating actuate)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:07
S53	4	S38 and (filament antenna electrode) with ((single near2 wire) or ("same" near2 wire)) same (actuator actuating actuate)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:07

S54	92	S38 and (filament antenna electrode) with ((single near2 wire) or ("same" near2 wire)) same2 (actuator actuating actuate)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:08
S55	504	S38 and (filament antenna electrode) with (form$3 made built) with (single near2 wire)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:09
S56	258	S38 and (filament antenna electrode) with (form$3 made built) with (single near2 wire) same (control$4 deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:09
S57	17	US-6379353-$.DID. OR US-6888919-$.DID. OR US-20020077627-$.DID. OR US-20040024300-$.DID. OR US-20040096033-$.DID. OR US-20040158239-$.DID. OR US-20050261570-$.DID. OR WO-9903397-$.DID. OR WO-0222019-$.DID. OR WO-2005036124-$.DID.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/02/12 14:23
S58	0	("2010/0256625").URPN.	USPAT	OR	ON	2014/02/12 14:23
S59	331	(filament antenna electrode array) with (form$3 made built) with (single near2 wire) same (control$4 deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:31
S60	258	S38 and(sylet filament antenna electrode array) with (form$3 made built) with (single near2 wire) same (control$4 deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:31
S61	258	S38 and(stylet filament antenna electrode array) with (form$3 made built) with (single near2 wire) same (control$4 deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT	OR	ON	2014/02/12 14:32
S62	258	S38 and(stylet filament antenna electrode array) with (form$3 made built) with (single near2 wire) same (control$4 deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/02/12 14:32

			FPRS; EPO; JPO			
S63	1,332	(filament electrode) with (form$3 made built) with (single near2 wire)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:33
S64	495	(filament electrode) with (form$3 made built) with (single near2 wire) and S38	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:34
S65	237	S64 not S59	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:34
S66	0	"606"/$.clas. and (helical) near2 (track thread) with (detents) same (deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:56
S67	0	"606"/$.clas. and (helical) near2 (track thread) same (detents) same (deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2014/02/12 14:56

			EPO; JPO			
S68	0	"606"/$.clas. and (track thread) same (detent) same (deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:56
S69	4,757	(track thread) same (detent) same (deploy$4 retract$4 advanc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:56
S70	14	(track thread) same (detent) same (indicat$4 alert$4) with (deploy$4 retract$4 advanc$4) same (visual tactile audible)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 14:57
S71	2	"20060264974".pgnr. "5827276".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/12 16:33
S72	1,332	(filament electrode) with (form$3 made built) with (single near2 wire)	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2014/02/14 12:00

			EPO; JPO			
S73	2,599	(filament electrode) with (form$3 made built) with (single near2 wire or "same" near2 wire)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/14 12:01
S74	389	S73 and "606"/$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/14 12:01
S75	50	"606"/$.ccls. and (distal near2 (tip end)) near4 (insulat$4) with (partially partial "part of")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/14 12:41
S76	0	"606"/$.ccls. and (distal near2 (tip end)) with (insulat$4) with (partially partial "part of") same ("non-adhere" "adhere")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/14 12:55
S77	126	"606"/$.ccls. and (distal near2 (tip end)) with (insulat$4 insulate insulated) with (partially partial "part of")	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2014/02/14 12:56

			EPO; JPO			
S78	76	S77 not S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2014/02/14 12:56
S79	57	(US-20040260282-$ or US-20050101950-$ or US-20060189972-$ or US-20060206133-$ or US-20060206132-$ or US-20060206131-$ or US-20090221998-$ or US-20090024124-$ or US-20060217705-$ or US-20010018586-$ or US-20010031941-$ or US-20060206130-$ or US-20060206129-$ or US-20060206111-$ or US-20070016183-$ or US-20070077230-$ or US-20080161804-$ or US-20070287996-$ or US-20090105640-$ or US-20060229645-$ or US-20060264974-$ or US-20020143302-$ or US-20040199179-$).did. or (US-2994324-$ or US-5599346-$ or US-5683384-$ or US-5728143-$ or US-5735847-$ or US-5782827-$ or US-5800484-$ or US-5810804-$ or US-5863290-$ or US-5913855-$ or US-5925042-$ or US-5928229-$ or US-5951547-$ or US-6053937-$ or US-6092528-$ or US-6254598-$ or US-6958062-$ or US-6132425-$ or US-6129726-$ or US-5672173-$ or US-7108696-$ or US-7357798-$ or US-5687739-$ or US-5749846-$ or US-2022065-$ or US-5995875-$).did. or (US-6123084-$ or US-6245070-$ or US-7198625-$ or US-7270661-$ or US-5507802-$ or US-6638275-$ or US-5827276-$ or US-5855576-$).did.	US-PGPUB; USPAT	OR	ON	2014/02/14 13:07
S80	27	S79 and (distal near2 (tip end point)) with (insulat$4 insulate insulated)	US-PGPUB; USPAT	OR	ON	2014/02/14 13:32
S81	8	(tip) with (filament stylet tine) with (active adj electrode)	US-PGPUB; USPAT	OR	ON	2014/06/16 15:31
S82	587	("0164184" | "1366756" | "1735271" | "1814791" | "1889609" | "1932258" | "1943543" | "1952617" | "1983669" | "2050904" | "2056377" | "2196171" | "2888928" | "3035580" | "3460539" | "3595239" | "3601126" | "3614414" | "3648001" | "3685518" | "3699967" | "3707149" | "3801766" | "3815604" | "3845771" | "3847153" | "3885569" | "3898991" | "3901242" | "3902494" | "3903891" | "3920021" | "3920022" | "3923063" | "3929137" | "3939839" | "3945375" | "3963030" | "3964487" | "3970088" | "3974833"	US-PGPUB; USPAT; USOCR	OR	ON	2014/06/16 15:33

| "4011872" | "4016881" | "4024467" | "4033351" | "4040426" | "4043342" | "4051855" | "4060088" | "4069827" | "4074718" | "4092986" | "4114623" | "4116198" | "4119102" | "4126137" | "4154240" | "4189685" | "4200104" | "4202337" | "4204549" | "4210152" | "4228800" | "4248231" | "4271837" | "4281373" | "4301802" | "4326529" | "4346332" | "4376263" | "4381007" | "4416277" | "4418692" | "4429698" | "4448198" | "4474179" | "4476862" | "4492231" | "4494541" | "4512338" | "4517976" | "4524770" | "4532924" | "4534347" | "4548207" | "4559943" | "4559951" | "4562838" | "4565200" | "4567890" | "4580557" | "4590934" | "4593691" | "4617927" | "4657015" | "4658819" | "4658820" | "4669468" | "4674499" | "4681122" | "4682596" | "4688569" | "4696668" | "4706667" | "4709698" | "4712544" | "4727874" | "4735201" | "4769005" | "4781175" | "4799480" | "4800899" | "4802476" | "4805616" | "4813429" | "4820298" | "4823791" | "4827927" | "4832048" | "4850353" | "4860744" | "4878493" | "4886074" | "4919129" | "4920978").PN. OR ("4931047" | "4936281" | "4936301" | "4936310" | "4936842" | "4943290" | "4950267" | "4955377" | "4966597" | "4967765" | "4969885" | "4976711" | "4994069" | "4998933" | "5007908" | "5009656" | "5013312" | "5019076" | "5035696" | "5037379" | "5047026" | "5047027" | "5057107" | "5062031" | "5071418" | "5080660" | "5083565" | "5085659" | "5088997" | "5098431" | "5099840" | "5108391" | "5108407" | "5117978" | "5122138" | "5133365" | "5158561" | "5167658" | "5167659" | "5171255" | "5171311" | "5178620" | "5190517" | "5195959" | "5196007" | "5197963" | "5201743" | "5207675" | "5217457" | "5217458" | "5217459" | "5221281" | "5244462" | "5249585" | "5250047" | "5258006" | "5259395" | "5261906" | "5267994" | "5267997" | "5277201" | "5277696" | "5281213" | "5281216" | "5282799" | "5282845" | "5290282" | "5290283" | "5300068" | "5300069" | "5300070" | "5304214" | "5306238" | "5318563" | "5320627" | "5330470" | "5330471" | "5334193" | "5334198" | "5336222" | "5342357" | "5342391" | "5344428" | "5352222" | "5354296" | "5366443" | "5370645" | "5370675" | "5372596" | "5382247" | "5383874" | "5383876" | "5383917" | "5383923" | "5395363" | "5395368" | "5403311" | "5419767" | "5422567" | "5423808" | "5423809" | "5423810" | "5423811" | "5431649" | "5437662" | "5438302" | "5441499" | "5443470" | "5454809" | "5462521" | "5472441" | "5472443" | "5480397" | "5480398" | "5496312" | "5496314" | "5505728" | "5505730" | "5507743" | "5514129" | "5514130" | "5514131" | "5520684" | "5520685" | "5522815").PN. OR ("5531744" | "5536267" | "5540680" | "5540681" | "5540682" | "5540683" | "5540684" | "5540685" | "5542916" | "5542945" | "5545161" | "5545193" | "5549605" | "5554172" | "5555618" | "5556396" | "5556397" | "5558671" | "5562720" | "5569164" | "5569242" | "5569244" | "5569245" | "5575789" | "5578007" | "5582609" | "5582610" | "5584830" | "5591141" |

		"5599344" | "5599345" | "5599346" | "5599347" | "5599348" | "5599349" | "5603711" | "5603712" | "5607422" | "5609151" | "5609573" | "5611798" | "5620481" | "5624439" | "5626560" | "5626575" | "5626576" | "5626578" | "5628745" | "5628771" | "5630426" | "5633578" | "5634924" | "5672174" | "5683366" | "5693045" | "5697281" | "5697536" | "5697882" | "5697909" | "5700262" | "5766153" | "5810764" | "5843019" | "5860951" | "5871469" | "5873855" | "5888198" | "5891095" | "Re33925").PN. OR ("6015406").URPN.				
S83	67	("5800482" | "5807395").PN. OR ("6053937").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/10/01 15:55
S84	1,050	"606"/$.ccls. and (bipolar) and (stylet filament) and (trocar needle)	US-PGPUB; USPAT; USOCR	OR	ON	2014/10/01 15:56
S85	752	"606"/29-41.ccls. and (bipolar) and (stylet filament) and (trocar needle)	US-PGPUB; USPAT; USOCR	OR	ON	2014/10/01 15:57
S86	43	"606"/29-41.ccls. and (bipolar) same (stylet filament antenna) same (trocar needle)	US-PGPUB; USPAT; USOCR	OR	ON	2014/10/02 08:26
S87	2	"7270661".pn. "5507802".pn.	US-PGPUB; USPAT; USOCR	OR	ON	2014/10/02 08:32
S88	9	bevel with (stylet filament) and 606/41.ccls.	US-PGPUB; USPAT	OR	ON	2014/10/02 10:21

S89	1	"20070287996".pgnr.	US-PGPUB; USPAT	OR	ON	2014/10/02 11:00
S90	64	(insulat$6) near4 (point tip) with (needle trocar) and 606/41.ccls.	US-PGPUB; USPAT	OR	ON	2014/10/02 11:02
S91	1,518	(insulat$6) near4 (point tip end) and 606/41.ccls.	US-PGPUB; USPAT	OR	ON	2014/10/02 11:12
S92	7	(partial$6) near2 (cover$4) with (insulat$6) near4 (point tip end) and 606/41.ccls.	US-PGPUB; USPAT	OR	ON	2014/10/02 11:12
S93	1	"20070203486".pgnr.	US-PGPUB; USPAT	OR	ON	2014/10/09 10:21
S94	522	bevel$4 with (filament tine)	US-PGPUB; USPAT	OR	ON	2014/10/09 10:28
S95	45	bevel$4 with tip with (filament tine)	US-PGPUB; USPAT	OR	ON	2014/10/09 10:37
S96	299	bevel$4 with tip with (filament tine stylet)	US-PGPUB; USPAT	OR	ON	2014/10/09 10:38
S97	16	bevel$4 with tip with (filament tine stylet) and 606/41.ccls.	US-PGPUB; USPAT	OR	ON	2014/10/09 10:39
S98	1	13/101009.app.	US-PGPUB;	OR	ON	2014/10/09 10:52

			USPAT			
S99	2	"20070203486"	US-PGPUB; USPAT	OR	ON	2015/03/20 13:40
S100	1	"13101009"	US-PGPUB; USPAT	OR	ON	2015/03/20 17:00
S101	0	(stylet filament antenna) with (retract$4) with (offset) with (angle)	US-PGPUB; USPAT	OR	ON	2015/03/23 10:33
S102	19	(stylet filament antenna) with (retract$4) with (offset)	US-PGPUB; USPAT	OR	ON	2015/03/23 10:34
S103	2,309	(indicia indicat$4 marking marker) with (rotat$4) with (distal) near5 (tip end)	US-PGPUB; USPAT	OR	ON	2015/03/23 10:47
S104	11	(indicia indicat$4 marking marker) near5 (hub) with (rotat$4) with (distal) near5 (tip end)	US-PGPUB; USPAT	OR	ON	2015/03/23 10:48
S105	89	(indicia indicat$4 marking marker) near5 (hub handle) with (rotat$4) with (distal) near5 (tip end)	US-PGPUB; USPAT	OR	ON	2015/03/23 11:32
S106	2	"20070203486"	US-PGPUB; USPAT	OR	ON	2015/03/23 11:36
S107	1	"13101009"	US-PGPUB; USPAT	OR	ON	2015/03/23 12:41

S108	9	("20010012956" | "20040059328" | "20040158239" | "20060084965" | "20070112340" | "20080161804" | "20080249392" | "20080269558" | "20110213356").PN.	US-PGPUB; USPAT	OR	ON	2015/03/23 12:43
S109	106	("2001/0012956" | "2004/0059328" | "2004/0158239" | "2006/0084965" | "2007/0112340" | "2008/0161804" | "2008/0249392" | "2008/0269558" | "2011/0213356").URPN.	USPAT	OR	ON	2015/03/23 12:43
S110	167	("1653819" | "20010044596" | "20020010491" | "20020055731" | "20020077676" | "20020099323" | "20020138117" | "20020183735" | "20020183740" | "20020193831" | "20030009110" | "20030060856" | "20030088189" | "20030130711" | "20030170898" | "20030195406" | "20030208200" | "20030225360" | "20040019371" | "20040059328" | "20040059389" | "20040146877" | "20040153057" | "20040199159" | "20040243107" | "20040267189" | "20050043726" | "20050049541" | "20050165393" | "20050171523" | "20050171574" | "20050182462" | "20050261672" | "20050288730" | "20060015147" | "20060025760" | "20060079883" | "20060121610" | "20060212078" | "20060217703" | "20060264752" | "20070016183" | "20070043345" | "20070118069" | "20070203486" | "20080052786" | "20080154259" | "20080167649" | "20090062792" | "20090228001" | "20090281477" | "20100049190" | "20100087813" | "20100130975" | "20100222677" | "20110202053" | "20120165813" | "20120310236" | "20130110106" | "4016886" | "4226246" | "4262672" | "4407943" | "4810963" | "4907601" | "4946793" | "5019034" | "5052391" | "5058605" | "5098843" | "5134070" | "5173158" | "5193537" | "5273525" | "5283194" | "5318563" | "5328451" | "5389069" | "5403311" | "5425752" | "5439440" | "5458625" | "5533999" | "5536240" | "5575811" | "5626146" | "5634899" | "5674267" | "5702359" | "5720921" | "5778894" | "5782882" | "5800378" | "5810762" | "5836905" | "5843026" | "5873849" | "5919142" | "5947889" | "5983131" | "5991697" | "5999847" | "6009347" | "6010613" | "6016452").PN. OR ("6041252" | "6055453" | "6068650" | "6085115" | "6090106" | "6102885" | "6106521" | "6109270" | "6122599" | "6132419" | "6159163" | "6208893" | "6210402" | "6212433" | "6216034" | "6219577" | "6241702" | "6261831" | "6278895" | "6300108" | "6326177" | "6347247" | "6349233" | "6351674" | "6387671" | "6403348" | "6470211" | "6482619" | "6493592" | "6500173" | "6526320" | "6562604" | "6607529" | "6611706" | "6613211" | "6627421" | "6653091" | "6669691" | "6692493" | "6697669" | "6697670" | "6702808" | "6795728" | "6801804" | "6865416" | "6881213" | "6892099" | "6912417" | "6927049" | "6962587" | "6972014" | "6994706" | "7053063" | "7063698" | "7130697" | "7211083" | "7267676" | "7387626" | "7455675" | "7771401" | "8511317").PN. OR ("8753335").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/03/23 12:44

S111	273	S109 S110	US-PGPUB; USPAT; USOCR	OR	ON	2015/03/23 12:45
S112	2	S111 and (rotat$4) near3 (mechanism) with (advancement advanc$4 deploy$4 retract$4)	US-PGPUB; USPAT; USOCR	OR	ON	2015/03/23 12:46
S113	3	S111 and (rotat$4) near3 (mechanism) same(advancement advanc$4 deploy$4 retract$4)	US-PGPUB; USPAT; USOCR	OR	ON	2015/03/23 12:46
S114	628	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2018/09/10 20:23
S115	25	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2018/09/10 20:23
S116	0	((("NIMBUS") near3 ("CONCEPTS") near3 ("LLC"))).AS,AANM.	USPAT	OR	OFF	2018/09/10 20:23
S117	2	"20060084965"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:25
S118	66	("20040158239" | "20050080409" | "20050107781" | "20060217702" | "3174851" | "3351463" | "3753700" | "5472441" | "5507743" | "5536267" | "5827276" | "5855576" | "6090105").PN. OR ("7229438").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:25

S119	5,060	(A61B18/1477 or A61B2018/1467).cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:28
S120	739	S119 and (stylet)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:28
S121	402	S119 and (stylet) and monopolar	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:28
S122	109	S119 and (stylet filaments) with actuat$4	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:41
S123	2	"13101009"	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:43
S124	8,841	(A61B2018/1253 or A61B2018/00577).cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:51
S125	1,129	S124 and (stylet filament)	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 20:51

S126	1	"5364351".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/10 21:18
S127	175	("5672173" | "5697536" | "5814066" | "5827276" | "6033401" | "6241725" | "6264651" | "6302898" | "6478793" | "6562059" | "6602248").PN. OR ("7108696").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/08/29 10:26
S128	451	("3987795" | "3991770" | "4033351" | "4043342" | "4121592" | "4237898" | "4289135" | "4303636" | "4346715" | "4411266" | "4565200" | "4574782" | "4586490" | "4660571" | "4763671" | "4800899" | "4838265" | "4907589" | "4920978" | "4931047" | "4940064" | "4945912" | "4976680" | "4976711" | "5003991" | "5009656" | "5013312" | "5015227" | "5026959" | "5047027" | "5057107" | "5059199" | "5067952" | "5071419" | "5078717" | "5080660" | "5084045" | "5085659" | "5100423" | "5115818" | "5125928" | "5128147" | "5183455" | "5190539" | "5197466" | "5197963" | "5205289" | "5207675" | "5215103" | "5217458" | "5246438" | "5251645" | "5252922" | "5267994" | "5277696" | "5281213" | "5290286" | "5300068" | "5304214" | "5336222" | "5365926" | "5385544" | "5397339" | "5403311" | "5411025").PN. OR ("5599346").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/08/29 10:52
S129	451	("3987795" | "3991770" | "4033351" | "4043342" | "4121592" | "4237898" | "4289135" | "4303636" | "4346715" | "4411266" | "4565200" | "4574782" | "4586490" | "4660571" | "4763671" | "4800899" | "4838265" | "4907589" | "4920978" | "4931047" | "4940064" | "4945912" | "4976680" | "4976711" | "5003991" | "5009656" | "5013312" | "5015227" | "5026959" | "5047027" | "5057107" | "5059199" | "5067952" | "5071419" | "5078717" | "5080660" | "5084045" | "5085659" | "5100423" | "5115818" | "5125928" | "5128147" | "5183455" | "5190539" | "5197466" | "5197963" | "5205289" | "5207675" | "5215103" | "5217458" | "5246438" | "5251645" | "5252922" | "5267994" | "5277696" | "5281213" | "5290286" | "5300068" | "5304214" | "5336222" | "5365926" | "5385544" | "5397339" | "5403311" | "5411025").PN. OR ("5599346").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/08/29 11:15
S130	2	"5599346".pn.	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/08/29 11:57

			FPRS; EPO; JPO			
S131	219	("2006/0095029").URPN.	USPAT	OR	OFF	2019/08/30 08:26
S132	198	S131 and deploy$4	USPAT	OR	OFF	2019/08/30 08:26
S133	65	S131 and deploy$4 same (thread$4 helical$4 track$4)	USPAT	OR	OFF	2019/08/30 08:27
S134	63	(US-20040260282-$ or US-20050101950-$ or US-20060189972-$ or US-20060206133-$ or US-20060206132-$ or US-20060206131-$ or US-20090221998-$ or US-20090024124-$ or US-20060217705-$ or US-20010018586-$ or US-20010031941-$ or US-20060206130-$ or US-20060206129-$ or US-20060206111-$ or US-20070016183-$ or US-20070077230-$ or US-20080161804-$ or US-20070287996-$ or US-20090105640-$ or US-20060229645-$ or US-20060264974-$ or US-20020143302-$ or US-20040199179-$ or US-20060095029-$ or US-20040015161-$ or US-20050085804-$).did. or (US-20060084965-$).did. or (US-2994324-$ or US-5599346-$ or US-5683384-$ or US-5728143-$ or US-5735847-$ or US-5782827-$ or US-5800484-$ or US-5810804-$ or US-5863290-$ or US-5913855-$ or US-5925042-$ or US-5928229-$ or US-5951547-$ or US-6053937-$ or US-6092528-$ or US-6254598-$ or US-6958062-$ or US-6132425-$ or US-6129726-$ or US-5672173-$ or US-7108696-$ or US-7357798-$ or US-5687739-$ or US-5749846-$ or US-2022065-$ or US-5995875-$).did. or (US-6123084-$ or US-6245070-$ or US-7198625-$ or US-7270661-$ or US-5507802-$ or US-6638275-$ or US-5827276-$ or US-5855576-$ or US-6015406-$ or US-8753335-$).did.	US-PGPUB; USPAT	OR	OFF	2019/08/30 10:21
S135	205	(a61b18/$5.cpc. a61b2018/$5.cpc.) and (hypotube) with (needle cannula)	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:01
S136	136	(a61b18/$5.cpc. a61b2018/$5.cpc.) and (tube) near5 conduct$4 near10 (cannula needle trocar)	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:16
S137	1	"15098673"	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:21

S138	2	"20080294162"	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:28
S139	1	"6878147".pn.	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:30
S140	1	"15225945"	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:34
S141	2,427	(a61b18/$5.cpc. a61b2018/$5.cpc.) and conduct$4 near10 (cannula needle trocar)	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:45
S142	272	(a61b18/$5.cpc. a61b2018/$5.cpc.) and conduct$4 near5 inner near10 (cannula needle trocar)	US-PGPUB; USPAT	OR	OFF	2019/08/30 11:46
S143	8	"5599346".pn. "20060095029"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2019/08/30 12:58
S144	659	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2019/08/30 13:00
S145	120	((ROBERT) near2 (WRIGHT)).INV.	EPO; JPO; DERWENT	OR	ON	2019/08/30 13:00
S146	26	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2019/08/30 13:00

S147	5	((SCOTT) near2 (BRANDT)).INV.	EPO; JPO; DERWENT	OR	ON	2019/08/30 13:00
S148	1	"7918852".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/03/16 14:34
S149	86	("20020019596" | "20020065541" | "20040116793" | "3946738" | "3964487" | "3980085" | "4003380" | "4043342" | "4116198" | "4126137" | "4188927" | "4214804" | "4245649" | "4474179" | "4476862" | "4483338" | "4565200" | "4590934" | "4651734" | "4655226" | "4674499" | "4685459" | "4727874" | "4844063" | "4907585" | "4907589" | "4955377" | "4966597" | "5007908" | "5009656" | "5019076" | "5267997" | "5342357" | "5383874" | "5403311" | "5433739" | "5651780" | "5697281" | "5697536" | "5697882" | "5697909" | "5827280" | "5843019" | "5888198" | "5891095" | "5902272" | "6004319" | "6056746" | "6066134" | "6106524" | "6146380" | "6149620" | "6159194" | "6193715" | "6312408" | "6312428" | "6379350" | "6416508" | "6506189" | "6582441" | "6632220" | "6837884").PN. OR ("7918852").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/16 16:44
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S151	4	"20040158239"	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/16 18:05
S152	6	"20070112340" "20080161804" "20080249392"	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/16 18:06

S153	130	(behl.in. epstein.in.) and 606/$5.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/16 19:17
S154	16	"11429921" "11173928"	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/16 19:19
S155	2	"20020095080"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/03/16 22:54
S156	673	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2020/03/17 13:53
S157	26	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2020/03/17 13:53
S158	15	(US-15796806-$ | US-55503426-$ | US-5961471-$ | US-6245064-$ | US-6424861-$ | US-7051569-$ | US-7111502-$ | US-7182509-$ | US-7204122-$ | US-7297123-$ | US-7344679-$ | US-7395103-$ | US-7574902-$ | US-7762718-$ | US-7905134-$ | US-7908906-$ | US-8020433-$).DID.	US-PGPUB; USPAT	OR	ON	2020/03/17 14:31
S159	1	"15098673"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/04/06 18:41

S160	673	((ROBERT) near2 (WRIGHT)).INV.	US-PGPUB; USPAT	OR	ON	2020/04/06 18:46
S161	26	((SCOTT) near2 (BRANDT)).INV.	US-PGPUB; USPAT	OR	ON	2020/04/06 18:46
S162	695	S160 S161	US-PGPUB; USPAT	OR	ON	2020/04/06 18:46
S163	47	S162 and filaments	US-PGPUB; USPAT	OR	ON	2020/04/06 18:47
S171	2	"15098673"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/06 10:15
S172	8	"5827276".pn. "20080161804" "20040158239"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 10:11
S173	2	"10716618".pn. "10736688".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 10:17

S174	2	"20080140066"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 10:31
S175	91	("20020022864" | "20030199862" | "20040064137" | "20070010809" | "20080249523" | "5749846" | "6105581" | "6699242" | "7318822" | "7393351" | "7399299" | "9402560" | "20090292259" | "20130096549" | "20170065334" | "5893847" | "6221071" | "6461314" | "8262574" | "10716618" | "20100076340" | "7896871" | "8512330" | "7918852" | "6471695" | "6752804" | "7344533" | "10736688" | "20020133148" | "6045532" | "6962587" | "8753335" | "6287304" | "6989004" | "7229438" | "7416549" | "9675406" | "20100049192" | "5383917" | "6216043" | "6740080" | "7419487" | "7458971" | "20060095029" | "20060206111" | "20070213703" | "20090306604" | "20110184403" | "5486161" | "6210406" | "7678107" | "7846157" | "8518037").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 11:41
S176	1	"15880111"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 11:48
S177	5	"20110073353"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2020/10/07 11:58
S178	2	"20170278585"	US-PGPUB; USPAT; USOCR;	OR	OFF	2020/10/07 12:03

			FPRS; EPO; JPO			

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L13	91	(filaments and probe and electrode).clm.	US-PGPUB; USPAT	OR	ON	2020/10/07 17:30
L14	10	(monopolar and (tine filament) and needle).clm.	US-PGPUB; USPAT	OR	ON	2020/10/07 17:31
S164	207,705	(filaments probe).clm.	US-PGPUB; USPAT	OR	ON	2020/04/06 18:47
S165	462	(filaments and probe).clm.	US-PGPUB; USPAT	OR	ON	2020/04/06 18:47
S166	88	(filaments and probe and electrode).clm.	US-PGPUB; USPAT	OR	ON	2020/04/06 18:47
S167	70	(filaments and probe).clm. and (a61b18/$5.cpc. a61b2018/$5.cpc.)	US-PGPUB; USPAT	OR	ON	2020/04/06 18:50
S168	2	"20060084965"	US-PGPUB; USPAT	OR	ON	2020/04/06 18:59
S169	4	"20070006215" "7108696".pn. "6989004".pn.	US-PGPUB; USPAT	OR	ON	2020/04/06 19:06
S170	46	("20020022864" | "20020133148" | "20030199862" | "20040064137" | "20070010809" | "20070213703" | "20080249523" | "20090306604" | "20100076340" | "20110184403" | "20130096549" | "20170065334" | "5383917" | "5486161" | "5749846" | "5893847" | "6045532" | "6105581" | "6210406" | "6216043" | "6221071" | "6287304" | "6461314" | "6471695" | "6699242" | "6740080" | "6752804" | "6962587" | "6989004" | "7229438" | "7318822" | "7344533" | "7393351" | "7399299" | "7416549" | "7419487" | "7458971" | "7678107" | "7846157" | "7896871" | "8262574" | "8512330" |	US-PGPUB; USPAT	OR	ON	2020/04/06 19:12

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10/7/2020 5:32:08 PM
C:\Users\ekim4\Documents\EAST\Workspaces\15098673.wsp

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

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

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2016-04-14
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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	7918852	B2	2011-04-05	Tullis et al.	
	2	10716618	B2	2020-07-21	Wright et al.	
	3	10736688	B2	2020-08-11	Wright 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
	1	20060206111	A1	2006-09-14	Young	
	2	20100049192	A1	2010-02-25	Holtz et al.	
	3	20090292259	A1	2009-11-26	Delano et al.	

Petitioner's Exhibit 1008
Avanos v. Stratus

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2016-04-14
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	4	20060095029	A1	2006-05-04	Young 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	2571439	EP	B1	2020-06-24	Stratus Medical, LLC		

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]
	1	LESLIE W. ORGAN, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 5, 2020, 19 pages.	
	2	WILLIAM SAMUEL HUNTER, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 20, 2020, 32 pages.	
	3	MARC ANDREW RUSSO, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated July 20, 2020, 70 pages.	
	4	PETER DARMOS, Amended Statement of Cross Claim Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated June 5, 2020, 32 pages.	

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

EXAMINER SIGNATURE

Examiner Signature	/EUN HWA KIM/	Date Considered	10/07/2020

*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.

Petitioner's Exhibit 1008
Avanos v. Stratus

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /EHK/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2016-04-14
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

[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.

Petitioner's Exhibit 1008
Avanos v. Stratus

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2016-04-14
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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.**

Petitioner's Exhibit 1008
Avanos v. Stratus

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Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

Petitioner's Exhibit 1008
Avanos v. Stratus

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
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U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1.	D372,086	07-23-1996	Grasso et al.	
	2.	RE40,279	04-29-2008	Sluijter et al.	
	3.	RE40,388	06-17-2008	Gines	
	4.	4,011,872	03-15-1977	Kamiya	
	5.	4,206,761	06-10-1980	Cosman	
	6.	4,206,762	06-10-1980	Cosman	
	7.	4,281,667	08-04-1981	Cosman	
	8.	4,353,371	10-12-1982	Cosman	
	9.	4,375,220	03-01-1983	Matvias	
	10.	4,378,809	04-05-1983	Cosman	
	11.	4,385,636	05-31-1983	Cosman	
	12.	4,411,266	10-25-1983	Cosman	
	13.	4,565,200	01-21-1986	Cosman	
	14.	4,573,980	03-04-1986	Karrasch et al.	
	15.	4,583,538	04-22-1986	Onik et al.	
	16.	4,593,703	06-10-1986	Cosman	
	17.	4,618,978	10-21-1986	Cosman	
	18.	4,646,752	03-03-1987	Swann et al.	
	19.	4,653,508	03-31-1987	Cosman	
	20.	4,660,568	04-28-1987	Cosman	
	21.	4,676,255	06-30-1987	Cosman	
	22.	4,698,207	10-06-1987	Bringham et al.	
	23.	4,787,886	11-29-1988	Cosman	
	24.	4,796,615	01-10-1989	Bullock et al.	
	25.	4,827,927	05-09-1989	Newton	
	26.	4,838,265	06-13-1989	Cosman et al.	
	27.	4,886,506	12-12-1989	Lovgren et al.	
	28.	4,907,589	03-13-1990	Cosman	

Examiner Signature	Date Considered

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U.S. PATENT DOCUMENTS

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	29.	4,966,597	10-30-1990	Cosman	
	30.	5,010,897	04-30-1991	Leveen	
	31.	5,160,337	11-03-1992	Cosman	
	32.	5,217,457	06-08-1993	Delahuerga et al.	
	33.	5,230,623	07-27-1993	Guthrie et al.	
	34.	5,233,515	08-03-1993	Cosman	
	35.	5,244,462	09-14-1993	Delahuerga et al.	
	36.	5,257,630	11-02-1993	Braitman et al.	
	37.	5,291,896	03-08-1994	Fonger et al.	
	38.	5,304,114	04-19-1994	Cosman et al.	
	39.	5,304,115	04-19-1994	Pflueger et al.	
	40.	5,312,329	05-17-1994	Beaty et al.	
	41.	5,312,391	05-17-1994	Wilk	
	42.	5,318,013	06-07-1994	Wilk	
	43.	5,324,255	06-28-1994	Passafaro et al.	
	44.	5,334,183	08-02-1994	Wuchinich	
	45.	5,342,292	08-30-1994	Nita et al.	
	46.	5,370,645	12-06-1994	Klicek et al.	
	47.	5,370,675	12-06-1994	Edwards et al.	
	48.	5,372,596	12-13-1994	Klicek et al.	
	49.	5,377,685	01-03-1995	Kazi et al.	
	50.	5,397,301	03-14-1995	Pflueger et al.	
	51.	5,401,272	03-28-1995	Perkins	
	52.	5,421,923	06-06-1995	Clarke et al.	
	53.	5,422,567	06-06-1995	Matsunaga	
	54.	5,423,809	06-13-1995	Klicek	
	55.	5,433,739	07-18-1995	Sluijter et al.	
	56.	5,447,417	09-05-1995	Kuhl et al.	

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	57.	5,458,597	10-17-1995	Edwards et al.	
	58.	5,472,441	12-05-1995	Edwards et al.	
	59.	5,472,442	12-05-1995	Klicek	
	60.	5,474,057	12-12-1995	Makower et al.	
	61.	5,484,398	01-16-1996	Stoddard	
	62.	5,496,312	03-05-1996	Klicek	
	63.	5,507,743	04-16-1996	Edwards et al.	
	64.	5,511,564	04-30-1996	Wilk	
	65.	5,514,129	05-07-1996	Smith	
	66.	5,536,267	07-16-1996	Edwards et al.	
	67.	5,541,376	07-30-1996	Ladtkow et al.	
	68.	5,560,358	10-01-1996	Arnold et al.	
	69.	5,562,703	10-08-1996	Desai	
	70.	5,571,147	11-05-1996	Sluijter et al.	
	71.	5,580,665	12-03-1996	Taguchi et al.	
	72.	5,599,345	02-04-1997	Edwards et al.	
	73.	5,599,346	02-04-1997	Edwards et al.	
	74.	5,611,709	03-18-1997	McAnulty	
	75.	5,613,966	03-25-1997	Makower et al.	
	76.	5,628,743	05-13-1997	Cimino	
	77.	5,662,111	09-02-1997	Cosman	
	78.	5,662,620	09-02-1997	Lieber et al.	
	79.	5,662,680	09-02-1997	Desai	
	80.	5,667,488	09-16-1997	Lundquist et al.	
	81.	5,669,904	09-23-1997	Platt, Jr. et al.	
	82.	5,672,173	09-30-1997	Gough et al.	
	83.	5,672,174	09-30-1997	Gough et al.	
	84.	5,683,349	11-04-1997	Makower et al.	

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	85.	5,683,384	11-04-1997	Gough et al.	
	86.	5,701,575	12-23-1997	Taguchi et al.	
	87.	5,720,744	02-24-1998	Eggleston et al.	
	88.	5,728,143	03-17-1998	Gough et al.	
	89.	5,735,847	04-07-1998	Gough et al.	
	90.	5,738,648	04-14-1998	Lands et al.	
	91.	5,748,703	05-05-1998	Cosman	
	92.	5,749,689	05-12-1998	Konig	
	93.	5,755,754	05-26-1998	Rudie et al.	
	94.	5,768,679	06-16-1998	Taguchi et al.	
	95.	5,772,659	06-30-1998	Becker et al.	
	96.	5,778,043	07-07-1998	Cosman	
	97.	5,782,827	07-21-1998	Gough et al.	
	98.	5,792,146	08-11-1998	Cosman	
	99.	5,797,906	08-25-1998	Rhum et al.	
	100.	5,800,484	09-01-1998	Gough et al.	
	101.	5,807,309	09-15-1998	Lundquist et al.	
	102.	5,810,804	09-22-1998	Gough et al.	
	103.	5,827,271	10-27-1998	Buysse et al.	
	104.	5,827,276	10-27-1998	LeVeen et al.	
	105.	5,848,967	12-15-1998	Cosman	
	106.	5,855,576	01-05-1999	LeVeen et al.	
	107.	5,863,290	01-26-1999	Gough et al.	
	108.	5,868,740	02-09-1999	LeVeen et al.	
	109.	5,911,739	06-15-1999	Kordis et al.	
	110.	5,913,855	06-22-1999	Gough et al.	
	111.	5,921,992	07-13-1999	Costales et al.	
	112.	5,925,042	07-20-1999	Gough et al.	

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	First Named Inventor	Robert E. Wright
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U.S. PATENT DOCUMENTS

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	113.	5,928,229	07-27-1999	Gough et al.	
	114.	5,935,123	08-10-1999	Edwards et al.	
	115.	5,951,547	09-14-1999	Gough et al.	
	116.	5,968,040	10-19-1999	Swanson et al.	
	117.	5,980,517	11-09-1999	Gough	
	118.	5,983,141	11-09-1999	Sluijter et al.	
	119.	6,006,126	12-21-1999	Cosman	
	120.	6,013,076	01-11-2000	Goble et al.	
	121.	6,014,590	01-11-2000	Whayne et al.	
	122.	6,015,406	01-18-2000	Goble et al.	
	123.	6,016,452	01-18-2000	Kasevich	
	124.	6,039,733	03-21-2000	Buysse et al.	
	125.	6,041,260	03-21-2000	Stern et al.	
	126.	6,044,846	04-04-2000	Edwards	
	127.	6,050,992	04-18-2000	Nichols	
	128.	6,053,937	04-25-2000	Edwards et al.	
	129.	6,059,780	05-09-2000	Gough et al.	
	130.	6,068,627	05-30-2000	Orszulak et al.	
	131.	6,071,280	06-06-2000	Edwards et al.	
	132.	6,080,150	06-27-2000	Gough	
	133.	6,090,105	07-18-2000	Zepeda et al.	
	134.	6,106,521	08-22-2000	Blewett et al.	
	135.	6,117,134	09-12-2000	Cunningham et al.	
	136.	6,122,341	09-19-2000	Butler et al.	
	137.	6,129,726	10-10-2000	Edwards et al.	
	138.	6,132,425	10-17-2000	Gough	
	139.	6,139,519	10-31-2000	Blythe	
	140.	6,139,547	10-31-2000	Lontine et al.	

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	First Named Inventor	Robert E. Wright
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U.S. PATENT DOCUMENTS

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	141.	6,143,003	11-07-2000	Cosman	
	142.	6,146,380	11-14-2000	Racz et al.	
	143.	6,161,048	12-12-2000	Sluijter et al.	
	144.	6,165,169	12-26-2000	Panescu et al.	
	145.	6,167,295	12-26-2000	Cosman	
	146.	6,179,834	01-30-2001	Buysse et al.	
	147.	6,210,403	04-03-2001	Klicek	
	148.	6,213,999	04-10-2001	Platt, Jr. et al.	
	149.	6,217,554	04-17-2001	Green	
	150.	6,228,080	05-08-2001	Gines	
	151.	6,228,083	05-08-2001	Lands et al.	
	152.	6,231,570	05-15-2001	Tu et al.	
	153.	6,234,178	05-22-2001	Goble et al.	
	154.	6,235,023	05-22-2001	Lee et al.	
	155.	6,241,725	06-05-2001	Cosman	
	156.	6,241,726	06-05-2001	Chia et al.	
	157.	6,246,912	06-12-2001	Sluijter et al.	
	158.	6,251,106	06-26-2001	Becker et al.	
	159.	6,259,952	07-10-2001	Sluijter et al.	
	160.	6,268,200	07-31-2001	Tucker et al.	
	161.	6,275,725	08-14-2001	Cosman	
	162.	6,277,117	08-21-2001	Tetzlaff et al.	
	163.	6,280,441	08-28-2001	Ryan	
	164.	6,312,426	11-06-2001	Goldberg et al.	
	165.	6,330,478	12-11-2001	Lee et al.	
	166.	6,331,180	12-18-2001	Cosman et al.	
	167.	6,334,861	01-01-2002	Chandler et al.	
	168.	6,352,536	03-05-2002	Buysse et al.	

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	169.	6,402,743	06-11-2002	Orszulak et al.	
	170.	6,402,747	06-11-2002	Lindermann et al.	
	171.	6,405,072	06-11-2002	Cosman	
	172.	6,416,520	07-09-2002	Kynast et al.	
	173.	6,419,653	07-16-2002	Edwards et al.	
	174.	6,419,680	07-16-2002	Cosman et al.	
	175.	6,419,798	07-16-2002	Topolkaraev et al.	
	176.	6,425,887	07-30-2002	McGuckin et al.	
	177.	6,440,127	08-27-2002	McGovern et al.	
	178.	6,447,477	09-10-2002	Burney et al.	
	179.	6,447,505	09-10-2002	McGovern et al.	
	180.	6,451,018	09-17-2002	Lands et al.	
	181.	6,454,765	09-24-2002	Leveen et al.	
	182.	6,458,130	10-01-2002	Frazier et al.	
	183.	6,459,769	10-01-2002	Cosman	
	184.	6,464,704	10-15-2002	Schmaltz et al.	
	185.	6,468,273	10-22-2002	Leveen et al.	
	186.	6,471,698	10-29-2002	Edwards et al.	
	187.	6,478,793	11-12-2002	Cosman et al.	
	188.	6,500,175	12-31-2002	Gough et al.	
	189.	6,506,189	01-14-2003	Rittman, III et al.	
	190.	6,517,534	02-11-2003	McGovern et al.	
	191.	6,530,922	03-11-2003	Cosman et al.	
	192.	6,533,987	03-18-2003	Topolkaraev et al.	
	193.	6,551,311	04-22-2003	Lee et al.	
	194.	6,562,033	05-13-2003	Shah et al.	
	195.	6,565,562	05-20-2003	Shah et al.	
	196.	6,569,159	05-27-2003	Edwards et al.	

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	197.	6,575,967	06-10-2003	Leveen et al.	
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	199.	6,585,735	07-01-2003	Frazier et al.	
	200.	6,602,249	08-05-2003	Stoddard et al.	
	201.	6,605,085	08-12-2003	Edwards	
	202.	6,610,054	08-26-2003	Edwards et al.	
	203.	6,622,731	09-23-2003	Daniel et al.	
	204.	6,623,481	09-23-2003	Garbagnati et al.	
	205.	6,632,221	10-14-2003	Edwards et al.	
	206.	6,632,222	10-14-2003	Edwards et al.	
	207.	6,638,275	10-28-2003	McGaffigan et al.	
	208.	6,641,580	11-04-2003	Edwards et al.	
	209.	6,645,201	11-11-2003	Utley et al.	
	210.	6,652,515	11-25-2003	Maguire et al.	
	211.	6,652,516	11-25-2003	Gough	
	212.	6,660,002	12-09-2003	Edwards et al.	
	213.	6,660,362	12-09-2003	Lindsay et al.	
	214.	6,663,624	12-16-2003	Edwards et al.	
	215.	6,669,693	12-30-2003	Friedman	
	216.	6,682,526	01-27-2004	Jones et al.	
	217.	6,682,528	01-27-2004	Frazier et al.	
	218.	6,685,701	02-03-2004	Orszulak et al.	
	219.	6,689,127	02-10-2004	Gough et al.	
	220.	6,690,210	02-10-2004	Hadjizada et al.	
	221.	6,692,490	02-17-2004	Edwards	
	222.	6,706,152	03-16-2004	Burazin et al.	
	223.	6,723,092	04-20-2004	Brown et al.	
	224.	6,743,226	06-01-2004	Cosman et al.	

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	225.	6,743,229	06-01-2004	Buysse et al.	
	226.	6,746,570	06-08-2004	Burazin et al.	
	227.	6,749,719	06-15-2004	Burazin et al.	
	228.	6,770,070	08-03-2004	Balbierz	
	229.	6,780,180	08-24-2004	Goble et al.	
	230.	6,803,549	10-12-2004	Yu	
	231.	6,814,712	11-09-2004	Edwards et al.	
	232.	6,837,956	01-04-2005	Cowell et al.	
	233.	6,846,448	01-25-2005	Rymer et al.	
	234.	6,847,848	01-25-2005	Sterzer et al.	
	235.	6,852,091	02-08-2005	Edwards et al.	
	236.	6,866,663	03-15-2005	Edwards et al.	
	237.	6,881,214	04-19-2005	Cosman et al.	
	238.	6,889,089	05-03-2005	Behl et al.	
	239.	6,896,675	05-24-2005	Leung et al.	
	240.	6,932,810	08-23-2005	Ryan	
	241.	6,958,062	10-25-2005	Gough et al.	
	242.	6,958,064	10-25-2005	Rioux et al.	
	243.	6,961,602	11-01-2005	Fuimaono et al.	
	244.	6,964,660	11-15-2005	Maguire et al.	
	245.	6,966,908	11-22-2005	Maguire et al.	
	246.	6,974,455	12-13-2005	Garabedian et al.	
	247.	6,997,925	02-14-2006	Maguire et al.	
	248.	7,025,767	04-11-2006	Schaefer et al.	
	249.	7,033,353	04-25-2006	Stoddard et al.	
	250.	7,044,949	05-16-2006	Orszulak et al.	
	251.	7,048,733	05-23-2006	Hartley et al.	
	252.	7,056,320	06-06-2006	Utley et al.	

Examiner Signature	Date Considered

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 10 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	253.	7,074,484	07-11-2006	Topolkaraev et al.	
	254.	7,076,399	07-11-2006	Godara	
	255.	7,087,051	08-08-2006	Bourne et al.	
	256.	7,099,712	08-29-2006	Fuimaono et al.	
	257.	7,108,696	09-19-2006	Daniel et al.	
	258.	7,112,197	09-26-2006	Hartley et al.	
	259.	7,115,124	10-03-2006	Xiao	
	260.	7,138,088	11-21-2006	Wariar et al.	
	261.	7,150,743	12-19-2006	Zvuloni et al.	
	262.	7,150,744	12-19-2006	Edwards et al.	
	263.	7,160,296	01-09-2007	Pearson et al.	
	264.	7,163,536	01-16-2007	Godara	
	265.	7,179,256	02-20-2007	Mest	
	266.	7,179,258	02-20-2007	Buysse et al.	
	267.	7,207,990	04-24-2007	Lands et al.	
	268.	7,258,688	08-21-2007	Shah et al.	
	269.	7,266,414	09-04-2007	Cornelius et al.	
	270.	7,270,660	09-18-2007	Ryan	
	271.	7,270,662	09-18-2007	Visram et al.	
	272.	7,276,064	10-02-2007	Paul et al.	
	273.	7,281,666	10-16-2007	Smith	
	274.	7,294,127	11-13-2007	Leung et al.	
	275.	7,306,596	12-11-2007	Hillier et al.	
	276.	7,311,702	12-25-2007	Tallarida et al.	
	277.	7,340,307	03-04-2008	Maguire et al.	
	278.	7,354,436	04-08-2008	Rioux et al.	
	279.	7,357,798	04-15-2008	Sharps et al.	
	280.	7,371,234	05-13-2008	Young	

Examiner Signature	Date Considered

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U.S. PATENT DOCUMENTS

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	281.	7,387,626	06-17-2008	Edwards et al.	
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	283.	7,416,549	08-26-2008	Young et al.	
	284.	7,449,020	11-11-2008	Edwards et al.	
	285.	7,468,062	12-23-2008	Oral et al.	
	286.	7,480,533	01-20-2009	Cosman et al.	
	287.	7,517,346	04-14-2009	Sloan et al.	
	288.	7,524,318	04-28-2009	Young et al.	
	289.	7,533,002	05-12-2009	Godara	
	290.	7,549,986	06-23-2009	Rioux et al.	
	291.	7,561,907	07-14-2009	Fuimaono et al.	
	292.	7,593,778	09-22-2009	Chandran et al.	
	293.	7,596,469	09-29-2009	Godara	
	294.	7,615,050	11-10-2009	Cross et al.	
	295.	7,670,336	03-02-2010	Young et al.	
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	297.	7,678,106	03-16-2010	Lee	
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	300.	7,771,420	08-10-2010	Butty et al.	
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	305.	7,815,571	10-19-2010	Deckman et al.	
	306.	7,819,869	10-26-2010	Godara et al.	
	307.	7,819,871	10-26-2010	Paul et al.	
	308.	7,824,404	11-02-2010	Godara et al.	

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	First Named Inventor	Robert E. Wright
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U.S. PATENT DOCUMENTS

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	309.	7,828,796	11-09-2010	Wong et al.	
	310.	7,874,986	01-25-2011	Deckman et al.	
	311.	7,875,025	01-25-2011	Cockburn et al.	
	312.	7,892,231	02-22-2011	Elliott	
	313.	7,896,874	03-01-2011	Young et al.	
	314.	2002/0026185	02-28-2002	Gough	
	315.	2002/0029037	03-07-2002	Kim	
	316.	2002/0188275	12-12-2002	McGuckin, Jr.	
	317.	2003/0018332	01-23-2003	Schmaltz et al.	
	318.	2003/0078595	04-24-2003	Cosman	
	319.	2004/0006336	01-08-2004	Swanson	
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	321.	2004/0015218	01-22-2004	Finch et al.	
	322.	2004/0100376	05-27-2004	Lye et al.	
	323.	2004/0122482	06-24-2004	Tung et al.	
	324.	2004/0143262	07-22-2004	Visram et al.	
	325.	2004/0176759	09-09-2004	Krishnamurthy et al.	
	326.	2004/0230187	11-18-2004	Lee et al.	
	327.	2004/0260282	12-23-2004	Gough et al.	
	328.	2005/0033279	02-10-2005	Edwards et al.	
	329.	2005/0059964	03-17-2005	Fitz	
	330.	2005/0101944	05-12-2005	Williams	
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	334.	2005/0177209	08-11-2005	Leung et al.	
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Examiner Signature	Date Considered

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	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
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U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	337.	2005/0234445	10-20-2005	Conquergood et al.	
	338.	2005/0240174	10-27-2005	Pearson et al.	
	339.	2005/0267552	12-01-2005	Conquergood et al.	
	340.	2005/0277918	12-15-2005	Shah et al.	
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	344.	2006/0111702	05-25-2006	Oral et al.	
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	348.	2006/0173359	08-03-2006	Lin et al.	
	349.	2006/0189972	08-24-2006	Grossman	
	350.	2006/0200121	09-07-2006	Mowery	
	351.	2006/0206127	09-14-2006	Conquergood et al.	
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	359.	2006/0217705	09-28-2006	Godara et al.	
	360.	2006/0247616	11-02-2006	Edwards et al.	
	361.	2006/0259026	11-16-2006	Godara et al.	
	362.	2006/0259027	11-16-2006	Kwan et al.	
	363.	2006/0271036	11-30-2006	Garabedian et al.	
	364.	2007/0006215	01-04-2007	Epstein et al.	

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Petitioner's Exhibit 1008
Avanos v. Stratus

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 14 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	365.	2007/0016183	01-18-2007	Lee et al.	
	366.	2007/0027449	02-01-2007	Godara et al.	
	367.	2007/0060921	03-15-2007	Janssen et al.	
	368.	2007/0112342	05-17-2007	Pearson et al.	
	369.	2007/0118191	05-24-2007	Godara	
	370.	2007/0123964	05-31-2007	Davies et al.	
	371.	2007/0156136	07-05-2007	Godara et al.	
	372.	2007/0161905	07-12-2007	Munrow	
	373.	2007/0167943	07-19-2007	Janssen et al.	
	374.	2007/0179380	08-02-2007	Grossman	
	375.	2007/0179491	08-02-2007	Kratoska et al.	
	376.	2007/0185522	08-09-2007	Davies et al.	
	377.	2007/0203402	08-30-2007	Godara et al.	
	378.	2007/0203486	08-30-2007	Young	
	379.	2007/0260234	11-08-2007	Mccullagh et al.	
	380.	2007/0282321	12-06-2007	Shah et al.	
	381.	2008/0015569	01-17-2008	Saadat et al.	
	382.	2008/0033493	02-07-2008	Deckman et al.	
	383.	2008/0045939	02-21-2008	Lee	
	384.	2008/0045940	02-21-2008	Lee	
	385.	2008/0048786	02-28-2008	Feldkamp et al.	
	386.	2008/0065062	03-13-2008	Leung et al.	
	387.	2008/0154259	06-26-2008	Gough et al.	
	388.	2008/0167646	07-10-2008	Godara et al.	
	389.	2008/0167649	07-10-2008	Edwards et al.	
	390.	2008/0208121	08-28-2008	Youssef et al.	
	391.	2008/0228180	09-18-2008	Epstein	
	392.	2008/0228181	09-18-2008	Godara et al.	

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	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 15 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

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	393.	2008/0269739	10-30-2008	Young et al.	
	394.	2008/0275443	11-06-2008	Oral et al.	
	395.	2009/0024124	01-22-2009	Lefler et al.	
	396.	2009/0054962	02-26-2009	Lefler et al.	
	397.	2009/0099544	04-16-2009	Munrow et al.	
	398.	2009/0131790	05-21-2009	Munrow et al.	
	399.	2009/0138011	05-28-2009	Epstein	
	400.	2009/0187177	07-23-2009	Epstein	
	401.	2009/0187182	07-23-2009	Epstein et al.	
	402.	2009/0187183	07-23-2009	Epstein	
	403.	2009/0198232	08-06-2009	Young et al.	
	404.	2009/0221998	09-03-2009	Epstein et al.	
	405.	2009/0228001	09-10-2009	Pacey	
	406.	2009/0287081	11-19-2009	Grossman et al.	
	407.	2009/0299358	12-03-2009	Lafontaine	
	408.	2010/0004651	01-07-2010	Biyani	
	409.	2010/0042098	02-18-2010	Cross et al.	
	410.	2010/0056926	03-04-2010	Deckman et al.	
	411.	2010/0076303	03-25-2010	McKinley	
	412.	2010/0099980	04-22-2010	Godara et al.	
	413.	2010/0114095	05-06-2010	Janssen et al.	
	414.	2010/0130974	05-27-2010	Young et al.	
	415.	2010/0185082	07-22-2010	Chandran et al.	
	416.	2010/0222677	09-02-2010	Placek et al.	
	417.	5,507,802	04-16-1996	Imran	
	418.	7,270,661	09-18-2007	Dahla et al.	
	419.	2007/0287996	12-13-2007	Rioux	

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	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 16 OF 20	Attorney Docket No.	NBUS.001C1C1

U.S. PATENT DOCUMENTS

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	420.	2004/0199179	10-07-2004	Elliott	
	421.	2006/0229645	10-12-2006	Bonnette et al.	
	422.	2004/0158239	08-12-2004	Behl et al.	
	423.	2007/0112340	05-17-2007	Thomas et al.	
	424.	2008/0161804	07-03-2008	Rioux et al.	
	425.	2008/0249392	10-09-2008	Mest	
	426.	2008/0269558	10-30-2008	Yahagi et al.	
	427.	2004/0059328	03-25-2004	Daniel et al.	
	428.	2011/0288540	11-24-2011	Wright et al.	
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	431.	2001/0012956 A1	08-09-2001	Behl et al.	
	432.	2006/0084965 A1	04-20-2006	Young et al.	

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FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]
	433.	DE 2124684	11-30-1972	Stadelmayr		
	434.	GB 2423024	08-16-2006	Instrumedical Ltd		
	435.	WO 96/29946	10-03-1996	Board of Regents of the University of Nebraska		
	436.	WO 2011/057157	05-12-2011	Wright		
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	438.	JP2003-527888	09-24-2003	NEOTHERMIA CORPORATION		X - Abs
	439.	WO 97/06739	02-27-1997	ZOMED INT INC.		
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NON PATENT LITERATURE DOCUMENTS

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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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	442.	BERJANO, Theoretical modeling for radiofrequency ablation: state-of-the-art and challenges for the future, *BioMedical Engineering OnLine,* Vol. 5(24), 17 pages, April 18, 2006.	
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	444.	CHOI et al., Overlapping Ablation Using a Coaxial Radiofrequency Electrode and Multiple Cannulae System: Experimental Study in ex-Vivo Bovine Liver, *Korean Journal of Radiology,* Vol. 4(2), pp. 117-123, June 2003.	
	445.	CHUA, Clinical Anatomy of the Thoracic Dorsal Rami, Thesis at the University of Newcastle, New South Wales, Australia, 220 pages, 1994.	
	446.	DERBY et al., The Efficacy of a Two Needle Electrode Technique in Percutaneous Radiofrequency Rhizotomy: An Investigational Laboratory Study in an Animal Model, *Pain Physician,* Vol. 9, pp. 207-214, 2006.	
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Examiner Signature	Date Considered

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application No.	16/933,995
	Filing Date	July 20, 2020
	First Named Inventor	Robert E. Wright
	Art Unit	3794
(Multiple sheets used when necessary)	Examiner	Eun Hwa Kim
SHEET 19 OF 20	Attorney Docket No.	NBUS.001C1C1

NON PATENT LITERATURE DOCUMENTS

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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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	455.	Baylis Medical Company, Inc., Pain Management; RF Generator V3 Platform, May 2008, in 6 pages.	
	456.	Baylis Medical Company, Inc., For Thoracic Medial Branch Neurotomy; ThoraCool™ Pain Management System, 2009, in 3 pages.	
	457.	Boston Scientific, LeVeen® Needle Electrodes; The Choice for Open, Laparoscopic or Percutaneous Radiofrequency Ablation, 2006, in 2 pages.	
	458.	Boston Scientific, LeVeen® CoAccess™ Electrode System; Coaxial Radiofrequency Ablation Device, 2006, in 2 pages.	
	459.	Diros Technology Inc., OWL Pain Management Sets, http://www.dirostech.com/22.php, (no date), in 3 pages.	
	460.	Diros Technology Inc., OWL Sterile Single Use (Disposable) RF Probes, http://www.dirostech.com/productdetail.php?a=16&b+3, 2007, in 1 page.	
	461.	Diros Technology Inc., OWL Re-Usable RF Probes, http://www.dirostech.com/productdetail.php?a=17&b=3, 2007, in 1 page.	
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	466.	NeuroTherm®, One System, Multiple Applications, March 2007, in 2 pages.	
	467.	NeuroTherm®, RF for Pain Management; Disposable RF Electrode, (no date) in 2 pages.	
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	471.	Stryker Instruments, "MultiGen™ One Machine; Four Lesions; Multiple Options," July 2008, in 8 pages.	

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	472.	International Search Report and Written Opinion of the International Searching Authority for International Application No. PCT/US2010/055744, mailed on March 1, 2011, in 34 pages.	
	473.	International Preliminary Report on Patentability issued in PCT/US2011/035253, dated November 27, 2012.	
	474.	International Search Report and Written Opinion of the International Searching Authority for International Application No. PCT/US2011/035253 mailed on August 18, 2011.	
	475.	Patent Examination Report issued in Australian Application No. 2011256709, dated March 22, 2013.	
	476.	Patent Examination Report issued in Australian Application No. 2010314930, dated July 26, 2013.	
	477.	Notice of Acceptance issued in Australian Application No. 2010314930, dated October 14, 2013.	
	478.	Notice of Acceptance issued in Australian Application No. 2011256709, dated October 10, 2013.	
	479.	Office Action issued in U.S. Application No. 13/101,009, dated March 6, 2014.	
	480.	Office Action issued in Japanese Application No. 2012-538056, dated May 19, 2014.	
	481.	Supplemental European Search Report and Search Opinion issued in EP Application No. 10829203.8, mailed May 9, 2014.	
	482.	Final Office Action issued in U.S. Application No. 13/101,009, dated July 3, 2014.	
	483.	Supplemental European Search Report and Search Opinion issued in EP Application No. 11783944, dated June 23, 2014.	
	484.	Office Action issued in Japanese Application No. 2013-511205, dated August 4, 2014.	X
	485.	Office Action issued in U.S. Application No. 13/101,009, dated October 17, 2014.	
	486.	Office Action issued in Chinese Application No. 201180035655.7, dated August 25, 2014.	X
	487.	Office Action issued in Korean Application No. 10-2012-7033363, dated December 23, 2014.	X
	488.	Patent Examination Report issued in Australian Application No. 2014200132, dated December 1, 2014.	
	489.	Office Action issued in Japanese Application No. 2012-538056, dated February 2, 2015.	

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Attorney Docket Number	NBUS.001C1C1

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Avanos v. Stratus

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	Examiner Name	Eun Hwa Kim
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	1	IP AUSTRALIA, Examination Report No. 1 for Standard Patent Application for Australian Patent Application No. 2019200358, dated 20 April 2020, 3 pages.
	2	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,778,997, dated 15 May 2020, 3 pages.

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	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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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Doc description: Information Disclosure Statement (IDS) Filed

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Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5383917		1995-01-24	Desai et al.	
	2	5486161		1996-01-23	Lax et al.	
	3	5749846		1998-05-12	Edwards et al.	
	4	5893847		1999-04-13	Kordis	
	5	6045532		2000-04-04	Eggers et al.	
	6	6105581		2000-08-22	Eggers et al.	
	7	6210406		2001-04-03	Webster	
	8	6216043		2001-04-10	Swanson et al.	

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	9	6221071		2001-04-24	Sherry et al.	
	10	6287304		2001-09-11	Eggers et al.	
	11	6461314		2002-10-08	Pant et al.	
	12	6471695		2002-10-29	Behl	
	13	6699242		2004-03-02	Heggeness	
	14	6740080		2004-05-25	Jain et al.	
	15	6752804		2004-06-22	Simpson et al.	
	16	6962587		2005-11-08	Johsnon et al.	
	17	6989004		2006-01-24	Hinchliffe et al.	
	18	7229438		2007-06-12	Young	
	19	7318822		2008-01-15	Darmos et al.	

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	20	7344533		2008-03-18	Pearson et al.	
	21	7393351		2008-07-01	Woloszko et al.	
	22	7399299		2008-07-15	Daniel et al.	
	23	7416549		2008-08-26	Young et al.	
	24	7419487		2008-09-02	Johnson et al.	
	25	7458971		2008-12-02	Zerfas et al.	
	26	7678107		2010-03-16	Young	
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	30	8512330		2013-08-20	Epstein et al.	

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	31	8518037		2013-08-27	Young	
	32	8753335		2014-06-17	Moshe et al.	
	33	9402560		2016-08-02	Organ et al.	
	34	9675406		2017-06-13	Moss et al.	

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	1	20020022864		2002-02-21	Mahvi et al.	
	2	20020133148		2002-09-19	Daniel et al.	
	3	20030199862		2003-10-23	Simpson et al.	
	4	20040064137		2004-04-01	Pellegrino et al.	
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	6	20070213703		2007-09-13	Naam et al.	
	7	20080249523		2008-10-09	McPherson et al.	
	8	20090306604		2009-12-10	Darmos et al.	
	9	20100076340		2010-03-25	Eckstein et al.	
	10	20110184403		2011-07-28	Brannan	
	11	20130096549		2013-04-18	Organ et al.	
	12	20170065334		2017-03-09	Wright et al.	

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	1	2017203754	AU		2017-06-22	Diros Technology Inc.		
	2	1211171	CN	A	1999-03-17	RITA MEDICAL SYSTEMS, INC.		X

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	3	1338909	CN	A	2002-03-06	Transurgical, Inc.		☒
	4	2418844	CN		2001-02-14	LOW TEMPERATURE TECHNOLOGY TESTING CENTER		☒
	5	1645235	EP	B1	2010-11-08	Covidien AG		☐
	6	1059067	EP	B1	2005-04-06	Sherwood Services AG		☐
	7	2003-527888	JP		2003-09-24	NEOTHERMIA CORPORATION		☒
	8	2009-504201	JP		2009-02-05	HALT MEDICAL, INC.		☒
	9	4290894	JP	B2	2009-04-10	ASUROKEA CORP		☒
	10	2001-527428	JP		2001-12-25	VIDAMED, INC.		☒
	11	2004-267759	JP		2004-09-30	Depuy Acromed, Inc.		☒
	12	2013-509966	JP		2013-03-21	Wright et al.		☒
	13	96/04860	WO		1996-02-22	ZOMED INTERNATIONAL, INC.		☐

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	14	96/16606	WO		1996-06-06	VIDAMED, INC.		☐
	15	97/29702	WO		1997-08-21	RITA MEDICAL SYSTEMS, INC.		☐
	16	97/06740	WO		1997-02-27	GOUGH et al.		☐
	17	97/06855	WO		1997-02-27	GOUGH et al.		☐
	18	97/06857	WO		1997-02-27	GOUGH et al.		☐
	19	99/25260	WO		1999-05-27	RITA MEDICAL SYSTEMS, INC.		☐
	20	00/06046	WO		2000-02-10	RADIOTHERAPEUTICS CORPORATION		☐
	21	01/28446	WO		2001-04-26	NEOTHERMIA CORPORATION		☐
	22	01/57655	WO		2001-08-09	BAYLOR COLLEGE OF MEDICINE		☐
	23	02/22032	WO		2002-03-21	RADIOTHERAPEUTICS CORPORATION		☐
	24	02/54941	WO		2002-07-18	RITA MEDICAL SYSTEMS, INC.		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	25	2006/044105	WO		2006-04-27	BOSTON SCIENTIFIC SCIMED, INC.		☐
	26	2006/104682	WO		2006-10-05	YOUNG		☐
	27	2007/005830	WO		2007-01-11	HALT MEDICAL, INC.		☐
	28	2008/083044	WO		2008-07-10	BOSTON SCIENTIFIC SCIMED, INC.		☐
	29	2011/113943	WO		2011-09-22	VESALIUS MEDICAL TECHNOLOGIES BVBA		☐
	30	2011/146243	WO		2011-11-24	NIMBUS CONCEPTS, LLC		☐

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Examiner Signature	/EUN HWA KIM/	Date Considered	10/07/2020

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Signature	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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Receipt date: 10/07/2020

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

PTO/SB/08a (02-18)
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Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

	1	EUROPEAN PATENT OFFICE, European Search Report and EPO Form 1703 01.91 TRI for European Patent Application No. EP 18215729.7, September 6, 2019, 5 pages.	
	2	EUROPEAN PATENT OFFICE, Communication Under Rule 71(3) EPC for European Patent Application No. EP 11783944.9, December 18, 2019, 125 pages.	
	3	INSTITUTO NACIONAL DA PROPRIEDADE INDUSTRIAL, Search Report for Brazilian Patent Application No. BR112012029263-3, December 6, 2019, 8 pages.	X
	4	UNITED STATES PATENT AND TRADEMARK OFFICE, Applicant-Initiated Interview Summary for U.S. Patent Application No. 15/092,945, February 18, 2020, 4 pages.	☐

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Petitioner's Exhibit 1008
Avanos v. Stratus
Page 330 of 385

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Robert E. Wright	
Application No.:	16/933,995	Art Unit: 3794
Filing Date:	July 20, 2020	
Title:	METHODS FOR RADIO FREQUENCY NEUROTOMY	
Examiner:	Eun Hwa Kim	
Confirmation No.:	4367	
Customer No.:	148468	

AMENDMENT PURSUANT TO 37 C.F.R. § 1.312

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

Commissioner:

In reply to the Notice of Allowability that issued on April 9, 2020 in the above-identified application, and pursuant to 37 C.F.R. § 1.312, the Applicant respectfully submits the present amendment.

Amendments to the Claims begin on page 2.

Remarks begin on page 8.

PTO/SB/08a (02-18)
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	2	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,799,505, dated 8 April 2020, 4 pages.
	3	EUROPEAN PATENT OFFICE, Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 11783944.9, dated 28 May 2020, 2 pages.
	4	UNITED STATES PATENT AND TRADEMARK OFFICE, Notice of Allowance for U.S. Patent Application No. 15/092,945, dated 16 March 2020, 16 pages.

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148468 7590 10/15/2020
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

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Daniel C. Higgs	(Typed or printed name)
	(Signature)
October 15, 2020	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

TITLE OF INVENTION: METHODS FOR RADIO FREQUENCY NEUROTOMY

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	01/15/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
KIM, EUN HWA	3794	606-034000

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

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

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

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

1 Med Venture Management, LLC
2 Daniel C. Higgs
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: Stratus Medical, LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Salt Lake City, Utah

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 _____

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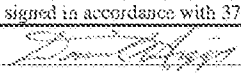
☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ 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.
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Authorized Signature  Date October 15, 2020

Typed or printed name Daniel C. Higgs Registration No. 55,265

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Petitioner's Exhibit 1008
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Electronic Patent Application Fee Transmittal

Application Number:	16933995
Filing Date:	20-Jul-2020
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Filer:	Daniel Christopher Higgs
Attorney Docket Number:	NBUS.001C1C1

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:				
UTILITY APPL ISSUE FEE	2501	1	600	600

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

Electronic Acknowledgement Receipt

EFS ID:	40860408
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	15-OCT-2020
Filing Date:	20-JUL-2020
Time Stamp:	23:35:02
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	E20200EN35513302
Deposit Account	602176
Authorized User	Daniel Higgs

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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		NBUS001C1C1_312_Amendment.pdf	107027 81177971b1b2da1a2bc134e2290c67499593ec47	yes	10

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Applicant Arguments/Remarks Made in an Amendment	8	10
Claims	2	7
Amendment after Notice of Allowance (Rule 312)	1	1

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	IDS_Reference_Form_NBUS001C1.pdf	1034696 9af1ae523e19740ea8e96675e8a914efaba055f7	no	4

Warnings:

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3	Non Patent Literature	Affidavit_of_Daniel_Higgs.pdf	2875944 892270ee29644e44887987d7e3b51c431a2ccf98	no	26

Warnings:

Information:

4	Non Patent Literature	NBUS004CA_OA3.pdf	3261144 a57bf7e26dd9c7f1648713a02bcb508b9677ee35	no	4

Warnings:

Information:

5	Non Patent Literature	NBUS004EU_Decision_to_Grant.pdf	99910 40ea743bdcdda3b1d02186a63fe4c67122686035	no	2
Warnings:					
Information:					
6	Non Patent Literature	NBUS004USC1_NOA.pdf	765482 ce3b83c16fe68ec95cbd93154140ab914b2a493e	no	16
Warnings:					
Information:					
7	Issue Fee Payment (PTO-85B)	PTOL_85B.pdf	1591105 f0274b8637689bf3ec7df19e99d45e71b0ba4620	no	1
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	30525 5a54be3470eaa5c00203748383875344e8df2dd6	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	9765833		

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

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New International Application Filed with the USPTO as a Receiving Office

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

Remarks

The Applicant thanks the Examiner for the Notice of Allowability dated October 15, 2020. Upon reviewing the Examiner's Amendment set forth in the Notice of Allowability, the Applicant has identified potentially clarifying amendments for dependent claim 11 and dependent claim 26, as set forth in the foregoing section. The Applicant respectfully requests that these amendments be entered, to the extent acceptable to the Examiner.

The Notice of Allowability was accompanied by an Information Disclosure Statement (IDS) that was only partially considered by the Examiner. Submitted herewith is an IDS that re-lists each of four (4) references from the prior IDS that were not considered. A copy of each listed reference is are also submitted therewith. The Applicant believes that, pursuant to 37 C.F.R. § 1.97(b)(1), no statements or fees need accompany the IDS, as it is being submitted within three months of the filing date of the present application.

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Comments on Statement of Reasons for Allowance

The Applicant respectfully submits the following comments on the Statement of Reasons for Allowance ("Statement") that was included in the Notice of Allowability.

The Applicant thanks the Examiner for her diligent review of the application and agrees that the claims are allowable. The Applicant takes no position regarding patentability other than positions taken during prosecution. Therefore, the Examiner's Statement should not be attributed to the Applicant as an indication of the basis for Applicant's belief that the claims are patentable. To the extent the Statement summarizes or paraphrases the claims, or otherwise deviates from the language of the claims, the Applicant respectfully submits that the meaning and scope of the claims depend on the actual language of the claims. To the extent the Statement focuses on or refers to only selected portions of a claim, the Applicant notes that the claims may contain additional limitations other than those mentioned or alluded to in the Statement, and that patentability is measured against a claim as a whole, not just selected limitations. Other limitations alone or in combination may provide distinguishing aspects over the prior art. To the extent the Statement suggests that the mentioned or alluded-to limitations have any special prominence, the Applicant does not necessarily agree. Further, the dependent claims may include additional limitations that may also provide further reasons for patentability.

The Applicant also respectfully notes that the Examiner-Initiated Interview Summary that accompanied the Notice of Allowability, which pertains to the interview conducted on October 6, 2020, includes the following discussion regarding the substance of the interview:

> There was a discussion for support of a single filament. Applicant explained that support can be found in paragraphs [0016], [0035], [0047]

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and Fig. 11C (in published PG publication of a parent case). Examiner agreed that there was support for a single filament.

To clarify, the foregoing excerpts from the written disclosure and drawings were identified as illustrative examples of certain embodiments that include a single filament, and thus provide support for arrangements in which only a single filament is present. The written disclosure and drawings also provide support for arrangements that include more than one filament (for example, two filaments, three filaments, four filaments, etc.). Accordingly, the claims are not limited to arrangements in which only a single filament is present. Indeed, because the claims use the open-ended transitional phrase "comprising" in conjunction with, e.g., the recited method elements and the term "a filament," the claims also encompass methods and/or arrangements involving more than one filament (for example, two filaments, three filaments, four filaments, etc.).

DATED this 15th day of October, 2020.

Respectfully submitted,

/Daniel C. Higgs/

Daniel C. Higgs
Attorney for Applicant
Registration No. 55,265

MED VENTURE HOLDINGS, LLC
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Salt Lake City, Utah 84116
(801) 703-1961

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Amendments to the Claims

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

1. (Cancelled)

2. (Cancelled)

3. (Previously presented) A method comprising:

inserting a needle into a patient, the needle comprising:

an elongate member;

a piercing tip at a distal end of the elongate member;

a lumen within the elongate member; and

a filament in a retracted position in which the filament is at least partially disposed within the elongate member;

moving the filament to a deployed position within the patient in which at least a distal end of the filament is out of the elongate member and disposed away from the tip;

inserting a radiofrequency probe into the lumen of the needle such that the radiofrequency probe contacts a conductive portion of the needle at a distal end of the needle to thereby establish an electrically conductive path from the radiofrequency probe to the filament; and

operating the radiofrequency probe, the tip, and the filament as a monopolar electrode, with radiofrequency energy from the radiofrequency probe being conducted to the filament through the electrically conductive path and transmitted by the filament.

4. (Previously presented) The method of claim 3, wherein said moving the filament to a deployed position within the patient takes place prior to said inserting the radiofrequency probe into the lumen of the needle.

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5. (Previously presented) The method of claim 3, wherein the needle further comprises a fitting in fluid communication with the lumen, the method further comprising:

connecting a fluid source to the fitting;

transporting fluid through the lumen of the needle to a target volume within the patient; and

disconnecting the fluid source from the fitting.

6. (Previously presented) The method of claim 5, wherein said inserting the radiofrequency probe into the lumen is achieved by passing the radiofrequency probe through the fitting.

7. (Previously presented) The method of claim 5, wherein said inserting the radiofrequency probe into the lumen takes place after said disconnecting the fluid source from the fitting.

8. (Previously presented) The method of claim 3, wherein said moving the filament to the deployed position comprises positioning the distal end of the filament distally beyond the tip of the needle.

9. (Previously presented) The method of claim 3, wherein said moving the filament to the deployed position places the distal end of the filament at a position that is spaced from a central longitudinal axis of the needle by a distance greater than a radius of the elongate member.

10. (Previously presented) The method of claim 3, further comprising attaching a return electrode pad to the patient prior to said operating the radiofrequency probe, the tip, and the filament as the monopolar electrode.

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11. (Currently amended) The method of claim 3, wherein the conductive portion comprises a conductive material in the tip, and wherein said inserting the radiofrequency probe into the lumen of the needle such that the radiofrequency probe contacts the conductive portion of the needle comprises contacting a distal end of the radiofrequency probe to the conductive material of the tip.

12. (Previously presented) The method of claim 3, further comprising:

after said inserting the needle into the patient, moving the needle to a target volume within the patient that includes a nerve; and

ablating the nerve to relieve pain of the patient.

13. (Previously presented) The method of claim 12, wherein said inserting the needle into the patient comprises inserting the needle within 30 degrees of perpendicular to a surface of the patient.

14. (Previously presented) The method of claim 12, wherein the nerve comprises a medial branch nerve proximate a lumbar facet joint of the patient.

15. (Previously presented) The method of claim 14, wherein said inserting the needle into the patient comprises inserting the needle within 30 degrees of perpendicular to a surface of the patient.

16. (Previously presented) The method of claim 12, wherein the nerve comprises a medial branch nerve positioned in an intertransverse space between adjacent thoracic vertebrae of the patient.

17. (Previously presented) The method of claim 12, wherein the nerve is proximate a cervical zygapophyseal joint of the patient.

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18. (Previously presented) The method of claim 12, wherein the nerve comprises a posterior ramus of a sacroiliac joint of the patient.

19. (Previously presented) The method of claim 12, wherein the nerve comprises an afferent nociceptive nerve.

20. (Previously presented) The method of claim 12, wherein said ablating comprises forming a lesion that includes the nerve and has a maximum cross dimension that is 10 millimeters or larger.

21. (Previously presented) The method of claim 12, wherein said ablating comprises forming a lesion that includes the nerve and has a volume of about 500 mm^3.

22. (Cancelled)

23. (Previously presented) The method of claim 3, wherein the probe directly contacts the tip during said operating the radiofrequency probe, the tip, and the filament as the monopolar electrode.

24. (Previously presented) A method comprising:

introducing a needle into a patient, the needle comprising:

an elongate member;

a lumen within the elongate member; and

a filament in a retracted position relative to the elongate member;

moving the filament to a deployed position within the patient;

inserting a radiofrequency probe into the lumen of the needle;

physically contacting the radiofrequency probe to a conductive portion of the needle at a distal end of the needle; and

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operating the radiofrequency probe and the filament as a monopolar electrode while the radiofrequency probe contacts the conductive portion of the needle, such that radiofrequency energy from the radiofrequency probe passes through the conductive portion of the needle and is transmitted by the filament.

25. (Previously presented) The method of claim 24, wherein the needle further comprises a piercing tip at a distal end of the elongate member, and wherein said operating the radiofrequency probe and the filament as the monopolar electrode further comprises operating the tip together with the radiofrequency probe and the filament as the monopolar electrode.

26. (Currently amended) The method of claim 25, wherein said physically contacting the radiofrequency probe to the conductive portion of the needle at [[a]]the distal end of the needle comprises physically contacting the radiofrequency probe to the tip.

27. (Previously presented) The method of claim 24, wherein said moving the filament to a deployed position within the patient takes place prior to said inserting the radiofrequency probe into the lumen of the needle.

28. (Previously presented) The method of claim 24, wherein the needle further comprises a fitting in fluid communication with the lumen, the method further comprising:

connecting a fluid source to the fitting;

transporting fluid through the lumen of the needle to a target volume within the patient; and

disconnecting the fluid source from the fitting.

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29. (Previously presented) The method of claim 24, further comprising:

after said inserting the needle into the patient, moving the needle to a target volume within the patient that includes a nerve; and

ablating the nerve to relieve pain of the patient.

30. (Previously presented) The method of claim 29, wherein the nerve is a medial branch nerve proximate a lumbar facet joint of the patient, a medial branch nerve positioned in an intertransverse space between adjacent thoracic vertebrae of the patient, a cervical zygapophyseal joint of the patient, or a posterior ramus of a sacroiliac joint of the patient.

31. (Previously presented) The method of claim 29, wherein said ablating comprises forming a lesion that includes the nerve and has a maximum cross dimension that is 10 millimeters or larger.

32. (Previously presented) The method of claim 29, wherein said ablating comprises forming a lesion that includes the nerve and has a volume of about 500 mm^3.

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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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

	1	PETER DARMOS, Further Amended Statement of cross claim, as proposed for submission in Federal Court of Australia Case No. NSD 438 of 2019, dated October 2020, 7 pages.
	2	DAVID LAWSON MORRIS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated October 21, 2020, 37 pages.
	3	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action in U.S. Patent Application No. 16/933,811, dated August 19, 2020, 34 pages.

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

Petitioner's Exhibit 1008
Avanos v. Stratus
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16933995
	Filing Date	2020-07-20
	First Named Inventor	Robert E. Wright
	Art Unit	3794
	Examiner Name	Eun Hwa Kim
	Attorney Docket Number	NBUS.001C1C1

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

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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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-11-02
Name/Print	Daniel C. Higgs	Registration Number	55265

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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:	16933995
Filing Date:	20-Jul-2020
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Filer:	Daniel Christopher Higgs
Attorney Docket Number:	NBUS.001C1C1

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
PETITION FEE-37CFR 1.17(H) (GROUP II)	2464	1	70	70
RCE- 1ST REQUEST	2801	1	680	680
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**750**

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Decision Date : November 2, 2020

In re Application of :

Robert Wright

DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 16933995

Filed : 20-Jul-2020

Attorney Docket No : NBUS.001C1C1

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed November 2, 2020, to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED.**

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 3794 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

Electronic Acknowledgement Receipt

EFS ID:	41013591
Application Number:	16933995
International Application Number:	
Confirmation Number:	4367
Title of Invention:	METHODS FOR RADIO FREQUENCY NEUROTOMY
First Named Inventor/Applicant Name:	Robert E. Wright
Customer Number:	148468
Filer:	Daniel Christopher Higgs
Filer Authorized By:	
Attorney Docket Number:	NBUS.001C1C1
Receipt Date:	02-NOV-2020
Filing Date:	20-JUL-2020
Time Stamp:	17:15:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$750
RAM confirmation Number	E2020A2H15407794
Deposit Account	602176
Authorized User	Daniel Higgs

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	Petition automatically granted by EFS	petition-request.pdf	31511 26b5b1e85631c41e24b61b1ba525d997ef27d32c	no	2
Warnings:					
Information:					
2	Quick Path Information Disclosure Statement	FORM_PTO_SB_09_QPIDS.pdf	196601 4ee499a64752c4f245ce39fb24a474d42a4ad250	no	2
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	FORM_PTO_SB_30_RCE.pdf	1349890 ca84ec3151f7b926b1c5fe0f71c1c4a1f5098478	no	3
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	FORM_PTO_SB_08a_IDS.pdf	1034579 433a73ec0827e74f55e5581fdd1ddd0e126caf3f	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.					
5	Non Patent Literature	FURTHER_AMENDED_STATEMENT.pdf	121059 2db989c9ec68b513bcc0606bb46397c34a3dec4c	no	7
Warnings:					
Information:					

6	Non Patent Literature	MORRIS.pdf	14037193 c0f6b76ad495f7ac3a0bd017db99108f921a7ea3	no	37
Warnings:					
Information:					
7	Non Patent Literature	16_933811_Office_Action.pdf	1550303 a4c014e42c6e9574ed053e2b7275a6421520fe29	no	34
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	32356 c7e669df31dae7c8eef5e8e34fc4a6da66fb7189	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	18353492		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

Doc Code: PET.AUTO Document Description: Petition automatically granted by EFS-Web	PTO/SB/140 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)**
Application Number	16933995
Filing Date	20-Jul-2020
First Named Inventor	Robert Wright
Art Unit	3794
Examiner Name	EUN HWA KIM
Attorney Docket Number	NBUS.001C1C1
Title	METHODS FOR RADIO FREQUENCY NEUROTOMY

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:
(1) Petition fee; and
(2) One of the following reasons:
(a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Petition Fee

◉	Small Entity
○	Micro Entity
○	Regular Undiscounted

Reason for withdrawal from issue

◯ One or more claims are unpatentable ◉ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees) ◯ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).
RCE request,submission, and fee. ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that : The RCE request ,submission, and fee have already been filed in the above-identified application on ☒ Are attached.
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES 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 been given power of attorney in this application. ◯ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity. ◯ A sole inventor ◯ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ◯ A joint inventor; all of whom are signing this e-petition

Signature	/Daniel C. Higgs/
Name	Daniel C. Higgs
Registration Number	55265

Doc Code: QPIDS.REQ
Document Description: QuickPath Information Disclosure Statement

PTO/SB/09 (09-18)

CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM

Non-Provisional Application Number: 16/933,995	Filing Date: July 20, 2020
First Named Inventor: Robert E. Wright	Title of Invention: METHODS FOR RADIO FREQUENCY ABLATION

THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.

1. Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
2. Check the box next to the appropriate selection:

   ☐ Each item of information contained in the IDS 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 IDS. See 37 CFR 1.97(e)(1).

   OR

   ☑ No item of information contained in the IDS 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 IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

   OR

   ☐ See attached certification statement in compliance with 37 CFR 1.97(e).
3. Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 602176.
4. A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**. **WARNING:** Do not submit the petition as a follow-on paper via EFS-Web. Submit the petition as a Web-based ePetition by signing on to EFS-Web as a registered user, selecting the radio button next to "Existing application/patent," and then selecting the radio button next to "ePetition (for automatic processing and immediate grant, if all petitions requirements are met)." Failure to use the Web-based ePetition interface will result in automatic entry of the RCE.
5. A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
6. The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
7. This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /Daniel C. Higgs/	Date November 2, 2020
Name (Print/Typed) Daniel C. Higgs	Practitioner Registration Number (If applicable) 55,265

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.**

☐ *Total of _____ forms are submitted.

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

Privacy Act Statement

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

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

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

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :69913

Sale Accounting Date:11/03/2020

Sale Item Reference Number	Effective Date
16933995	11/02/2020

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I2020A3J05561485	2806	SUBMISSION- INFORMATION DISCLOSURE STMT	$130.00	Deposit Account

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1

CONFIRMATION NO. 4367

148468
Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

PUBLICATION NOTICE

OC000000121156018

Title:METHODS FOR RADIO FREQUENCY NEUROTOMY

Publication No.US-2020-0345412-A1
Publication Date:11/05/2020

NOTICE OF PUBLICATION OF APPLICATION

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

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

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

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

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

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

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 366 of 385

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

148468 7590 12/02/2020

Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

EXAMINER	
KIM, EUN HWA	

ART UNIT	PAPER NUMBER
3794	

NOTIFICATION DATE	DELIVERY MODE
12/02/2020	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):

dhiggs@biomerics.com
dhiggs@medventureholdings.com

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 367 of 385

Supplemental ***Notice of Allowability***	**Application No.** 16/933,995	**Applicant(s)** Wright et al.	
	Examiner EUNHWA KIM	**Art Unit** 3794	**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 IDS filed on 10/15/2020.
   ☐ 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 3-21 and 23-32 . 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 _____.

/EUN HWA KIM/
Primary Examiner, Art Unit 3794

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 368 of 385

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	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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					

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

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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]
	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]

Petitioner's Exhibit 1008
Avanos v. Stratus

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

	1	PETER DARMOS, Further Amended Statement of cross claim, as proposed for submission in Federal Court of Australia Case No. NSD 438 of 2019, dated October 2020, 7 pages.
	2	DAVID LAWSON MORRIS, Affidavit Submitted in Federal Court of Australia Case No. NSD 438 of 2019, dated October 21, 2020, 37 pages.
	3	UNITED STATES PATENT AND TRADEMARK OFFICE, Office Action in U.S. Patent Application No. 16/933,811, dated August 19, 2020, 34 pages.

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EXAMINER SIGNATURE

Examiner Signature	/EUN HWA KIM/	Date Considered	11/25/2020

*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.

Petitioner's Exhibit 1008
Avanos v. Stratus

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.H.K/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16933995
Filing Date	2020-07-20
First Named Inventor	Robert E. Wright
Art Unit	3794
Examiner Name	Eun Hwa Kim
Attorney Docket Number	NBUS.001C1C1

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	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-11-02
Name/Print	Daniel C. Higgs	Registration Number	55265

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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Avanos v. Stratus

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

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	2	CANADIAN INTELLECTUAL PROPERTY OFFICE, Office Action for Canadian Patent Application No. 2,799,505, dated 8 April 2020, 4 pages.
	3	EUROPEAN PATENT OFFICE, Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 11783944.9, dated 28 May 2020, 2 pages.
	4	UNITED STATES PATENT AND TRADEMARK OFFICE, Notice of Allowance for U.S. Patent Application No. 15/092,945, dated 16 March 2020, 16 pages.

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Examiner Signature	/EUN HWA KIM/	Date Considered	11/25/2020

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Petitioner's Exhibit 1008
Avanos v. Stratus
Page 376 of 385

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Document Code:WFEE

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Sale Adjustment Accounting Date:12/07/2020

Effective Date	Sale Accounting Date	Sale Item Reference Number
11/02/2020	12/07/2020	16933995

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I2020B7937160070	2801	RCE- 1ST REQUEST	$680.00	Visa

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11/02/2020	16933995	$680.00

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	07/20/2020	Robert E. Wright	NBUS.001C1C1	4367

148468 7590 01/06/2021

Med Venture Management, LLC
6030 W. Harold Gatty Dr.
Salt Lake City, UT 84116

EXAMINER	
KIM, EUN HWA	

ART UNIT	PAPER NUMBER
3794	

NOTIFICATION DATE	DELIVERY MODE
01/06/2021	ELECTRONIC

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

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

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

dhiggs@biomerics.com
dhiggs@medventureholdings.com

Petitioner's Exhibit 1008
Avanos v. Stratus
Page 379 of 385

Supplemental ***Notice of Allowability***	**Application No.** 16/933,995	**Applicant(s)** Wright et al.	
	Examiner EUNHWA KIM	**Art Unit** 3794	**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 IDS filed on 10/7/2020.
   ☐ 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 3-21 and 23-32 . 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 _____.

/EUN HWA KIM/ Primary Examiner, Art Unit 3794	/EUN HWA KIM/ Primary Examiner, Art Unit 3794

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

PTO/SB/08a (02-18)
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	4	UNITED STATES PATENT AND TRADEMARK OFFICE, Applicant-Initiated Interview Summary for U.S. Patent Application No. 15/092,945, February 18, 2020, 4 pages.	☐

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Signature	/Daniel C. Higgs/	Date (YYYY-MM-DD)	2020-10-07
Name/Print	Daniel C. Higgs	Registration Number	55265

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.**

Petitioner's Exhibit 1008
Avanos v. Stratus

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Privacy Act Statement

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

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

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

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

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

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

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

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

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/933,995	02/23/2021	10925664	NBUS.001C1C1	4367

148468 7590 02/03/2021

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ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

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

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

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

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

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

Stratus Medical, LLC, Salt Lake City, UT;
Robert E. Wright, Clayton, AUSTRALIA;
Scott A. Brandt, Denver, CO;

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