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8 de agosto de 2019

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NÚMERO DE SOLICITUD: 16/056.038

FECHA DE PRESENTACIÓN: 6 de agosto de 2018

EL CÓDIGO DEL PAÍS Y EL NÚMERO DE SU SOLICITUD DE PRIORIDAD, QUE SE USARÁN PARA LA PRESENTACIÓN EN EL EXTRANJERO EN VIRTUD DE LA CONVENCIÓN DE PARÍS, ES US16/056.038

Por autoridad del
Subsecretario de Comercio para la Propiedad Intelectual
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Funcionario certificador

Reivindicaciones

1. Un aparato para el tratamiento vascular, que comprende:

un catéter que comprende un lumen interior;

un elemento expandible que comprende:

5 un extremo proximal;

un extremo distal;

una porción trenzada ubicada entre el extremo proximal y el extremo distal

que comprenden un lumen entre ellos;

un miembro de anclaje proximal ubicado en el extremo proximal;

10 un miembro de anclaje distal ubicado en el extremo distal;

en donde el elemento expandible comprende una configuración comprimida dimensionada para encajar dentro del lumen interior del catéter; y

en donde el elemento expandible comprende una configuración parcialmente implantada en donde el extremo proximal se dimensiona para

15 encajar dentro del lumen interior del catéter y el extremo distal se dimensiona más grande que el catéter; y

un cable de suministro ubicado dentro y que se extiende a través del lumen interior y el elemento expandible, que comprende:

una porción proximal;

20 una primera porción intermedia ubicada distal a la porción proximal;

una segunda porción intermedia ubicada distal a la primera porción intermedia;

una porción distal ubicada distal a la segunda porción intermedia;

un miembro de protuberancia empujadora ubicado adyacente a la porción proximal y la primera porción intermedia;

un miembro de protuberancia de recaptura ubicado adyacente a la primera porción intermedia y la segunda porción intermedia; y

5 un miembro de protuberancia distal ubicado adyacente a la segunda porción intermedia y la porción distal,

en donde el elemento expandible es móvil desde la configuración comprimida a la configuración parcialmente implantada por un movimiento distal del cable de suministro que hace que el miembro de protuberancia distal del cable de suministro se acople con
10 el miembro de anclaje distal del elemento expandible y empuje distalmente el miembro de anclaje distal expulsando, de esta manera, el miembro de anclaje distal del catéter,

en donde el cable de suministro es móvil distal y proximalmente en relación con el elemento expandible en la configuración parcialmente implantada, y

en donde el elemento expandible es retráctil desde la configuración parcialmente
15 implantada por un movimiento proximal del cable de suministro, lo que provoca que el miembro de protuberancia de recaptura se acople con el miembro de anclaje proximal del elemento expandible y empuje proximalmente el miembro de anclaje proximal retrayendo, de esta manera, al menos una porción del elemento expandible en el catéter.

20 2. El aparato de la reivindicación 1 en donde el elemento expandible es móvil desde la configuración parcialmente implantada a una configuración implantada por un movimiento distal del cable de suministro que hace que el miembro de protuberancia empujadora del cable de suministro se acople con el miembro de anclaje proximal del

elemento expandible y empuje distalmente el miembro de anclaje proximal, expulsando de esta manera el extremo proximal del elemento expandible del catéter.

3. El aparato de la reivindicación 1 en donde,

5 el elemento expandible está en la configuración comprimida y se ubica completamente dentro del lumen interior del catéter,

el miembro de protuberancia distal se ubica dentro del lumen de la porción trenzada del elemento expandible,

10 el miembro de protuberancia de recaptura se ubica dentro del lumen de la porción trenzada del elemento expandible, y

el miembro de protuberancia proximal se ubica proximal al miembro de anclaje proximal.

4. El aparato de la reivindicación 1 en donde,

15 el elemento expandible está en la configuración parcialmente implantada,

el extremo distal del elemento expandible se ubica fuera del catéter,

el extremo proximal y el miembro de anclaje proximal del elemento expandible se ubican dentro del lumen interior del catéter, y

20 la protuberancia de recaptura es móvil para retraer al menos una porción del elemento expandible en el lumen del catéter.

5. El aparato de la reivindicación 1 en donde al menos uno del miembro de protuberancia distal, miembro de protuberancia de recaptura, y miembro de protuberancia proximal comprende material radiopaco.

5 6. El aparato de la reivindicación 1 en donde la porción trenzada del miembro expandible es un ligamento tafetán.

7. El aparato de la reivindicación 1 en donde la porción trenzada del elemento expandible es un elemento autoexpandible.

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8. El aparato de la reivindicación 1 en donde la porción trenzada ocluye un cuello de un aneurisma.

9. El aparato de la reivindicación 1 en donde la porción trenzada soporta material
15 embólico dentro del aneurisma.

10. El aparato de la reivindicación 1 en donde solo un miembro de protuberancia es capaz de acoplar un miembro de anclaje en cualquier momento.

20 11. Un método para desplegar un implante que comprende las etapas de:
proporcionar un sistema de suministro de implantación que comprende un catéter, un elemento expandible, y un cable de suministro;
ubicar un anclaje proximal en un extremo proximal del elemento expandible;

ubicar un anclaje distal en un extremo distal del elemento expandible;

ubicar una protuberancia distal en el cable de suministro;

ubicar una protuberancia de recaptura en el cable de suministro proximal a la protuberancia distal;

5 ubicar una protuberancia proximal en el cable de suministro proximal a la protuberancia de recaptura;

ubicar la protuberancia distal y la protuberancia de recaptura dentro de un lumen del elemento expandible;

ubicar la protuberancia proximal proximal al elemento expandible;

10 ubicar el elemento expandible y al menos una porción del cable de suministro dentro de un lumen del catéter;

implantar parcialmente el elemento expandible, que comprende las etapas de:

mover el anclaje distal y el elemento expandible distalmente a través del lumen del catéter al empujar el cable de suministro distalmente empujando, de esta manera, la protuberancia distal contra el anclaje distal mientras que la protuberancia proximal y la protuberancia de recaptura permanecen desacopladas del elemento expandible;

15 expandir el anclaje distal desde un extremo distal del catéter al empujar distalmente el cable de suministro empujando, de esta manera, la protuberancia distal contra el anclaje distal mientras que la protuberancia proximal y la protuberancia de recaptura permanecen desacopladas del elemento expandible; y

20 expandir el anclaje distal expulsado desacoplando, de esta manera, la protuberancia distal del elemento expandible;

retraer al menos una porción del elemento expandible en el catéter al jalar proximalmente el cable de suministro jalando, de esta manera, la protuberancia de recaptura contra el anclaje proximal mientras la protuberancia distal y la protuberancia proximal permanecen desacopladas del elemento expandible; y

5 completar la implantación del elemento expandible, que comprende las etapas de:

expulsar el anclaje proximal del extremo distal del catéter al empujar distalmente el cable de suministro desacoplando, de esta manera, la protuberancia de recaptura del elemento expandible y empujando la protuberancia proximal contra el anclaje proximal; y

10

expandir el anclaje proximal expulsado desacoplando, de esta manera, la protuberancia proximal.

12. El método de la reivindicación 11 que comprende, además, la etapa de mover el cable de suministro independientemente del elemento expandible mientras se mantiene el anclaje proximal dentro del lumen del catéter.

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13 El método de la reivindicación 11 que comprende, además, la etapa de ubicar el elemento expandible dentro de un lumen de cuerpo.

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14. El método de la reivindicación 11 que comprende, además, la etapa de ubicar el elemento expandible para ocluir el cuello de un aneurisma.

15. El método de la reivindicación 14 que comprende, además, la etapa de ubicar el elemento expandible para soportar material embólico en el aneurisma.

16. Un sistema de implantación de stent que comprende:

5 un catéter;

un stent trenzado que comprende un primer anclaje expandible en un extremo distal y un segundo anclaje expandible en un extremo proximal,

en donde el stent trenzado es móvil en una configuración comprimida a través del catéter, y

10 en donde el stent trenzado es móvil a una configuración parcialmente implantada de manera que el primer anclaje expandible se expande en una posición implantada distal al catéter y el segundo anclaje expandible se comprime dentro del catéter; y

un cable de suministro que comprende una protuberancia empujadora, una protuberancia jaladora y una protuberancia de recaptura,

15 en donde el cable de suministro se extiende a través del stent trenzado cuando el stent trenzado está en la configuración comprimida y cuando el stent trenzado está en la configuración parcialmente implantada,

en donde la protuberancia empujadora se ubica proximal al segundo anclaje expandible cuando el stent trenzado está en la configuración comprimida y cuando el

20 stent trenzado está en la configuración parcialmente implantada,

en donde la protuberancia jaladora y la protuberancia de recaptura se ubican dentro del stent trenzado cuando el stent trenzado está en la configuración comprimida,

en donde un movimiento distal del cable de suministro cuando el stent trenzado está en la configuración comprimida empuja la protuberancia jaladora contra el primer anclaje expandible para mover distalmente el elemento expandible mientras que la protuberancia empujadora y la protuberancia de recaptura se desacoplan del elemento expandible,

5 en donde un movimiento distal del cable de suministro cuando el stent trenzado está en la configuración parcialmente implantada empuja la protuberancia empujadora contra el segundo anclaje expandible para mover distalmente el elemento expandible mientras que la protuberancia jaladora y la protuberancia de recaptura se desacoplan del elemento expandible, y

10 en donde un movimiento proximal del cable de suministro cuando el stent trenzado está en la configuración parcialmente implantada jala la protuberancia de recaptura contra el segundo anclaje expandible para mover proximalmente el elemento expandible mientras que la protuberancia jaladora y la protuberancia empujadora se desacoplan del elemento expandible.

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17. El sistema de la reivindicación 16 en donde el primer anclaje expandible se dimensiona más grande que un diámetro de la protuberancia jaladora cuando el stent trenzado está en la configuración parcialmente implantada.

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18. El sistema de la reivindicación 16 en donde el primer anclaje expandible se dimensiona para permanecer anclado independiente de cualquier movimiento de la protuberancia jaladora cuando el stent trenzado está en la configuración parcialmente implantada.

19. El sistema de la reivindicación 16 en donde el primer anclaje expandible se libera de la protuberancia jaladora cuando el stent trenzado está en la configuración parcialmente implantada.



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August 08, 2019

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APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A
FILING DATE UNDER 35 USC 111.**

APPLICATION NUMBER: 16/056,038

FILING DATE: August 06, 2018

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY
APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS
CONVENTION, IS US16/056,038**

**By Authority of the
Under Secretary of Commerce for Intellectual Property
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W. Montgomery
W. MONTGOMERY
Certifying Officer

Electronic Acknowledgement Receipt	
EFS ID:	33385853
Application Number:	16056038
International Application Number:	
Confirmation Number:	6547
Title of Invention:	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT
First Named Inventor/Applicant Name:	Robert SLAZAS
Customer Number:	6980
Filer:	Louis J. DelJuidice
Filer Authorized By:	
Attorney Docket Number:	243382.000144
Receipt Date:	06-AUG-2018
Filing Date:	
Time Stamp:	17:23:22
Application Type:	Utility under 35 USC 111(a)

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Payment Type	DA
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RAM confirmation Number	080718INTEFSW00004805201507
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Authorized User	
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	DEPUY144_Track_1.pdf	153991	no	1
			5f62e2fc03a5285d0ae35cd160ae13e8c7123de		
Warnings:					
Information:					
2	Transmittal of New Application	DEPUY144_Transmittal.pdf	279995	no	1
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Warnings:					
Information:					
3	Application Data Sheet	DEPUY144_ADS.pdf	1277247	no	9
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Warnings:					
Information:					
4	Power of Attorney	DEPUY144_POA.pdf	736648	no	2
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5	Drawings-only black and white line drawings	DEPUY144_DRWGS.pdf	4901456	no	13
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	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	14	
	Claims		15	20	
	Abstract		21	21	
Warnings:					
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7	Fee Worksheet (SB06)	fee-info.pdf	40228	no	2
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UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 CFR 1.53(b))		Attorney Docket No. 243382.000144																	
First Named Inventor Robert SLAZAS		Title BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT																	
Priority Mail Express® Label No.																			
APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450																	
1. ☐ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☐ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages 21] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 13] 6. Inventor's Oath or Declaration [Total Pages] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☐ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies		ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee) 12. ☐ English Translation Document (if applicable) 13. ☐ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☒ Other: Certification and Request for Prioritized Examination _____ _____ _____																	
*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS). (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).																			
19. CORRESPONDENCE ADDRESS																			
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BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT

Field of the Disclosure

This disclosure relates generally to devices for interventional therapeutic treatment or vascular surgery for treatment of defects in the vasculature, and more particularly concerns a system for delivering a self-expanding device or stent to a treatment site in a body lumen of a patient.

Background

Cardiac stents, which are an example of a self-expanding device, are inserted into a blood vessel to provide an open path within the blood vessel, have been widely used in intravascular angioplasty treatment of occluded cardiac arteries, and in other applications. Stents are often deployed by use of inflatable balloons, or mechanical devices which force the stent open, thereby reinforcing the artery wall and provide a clear through-path in the center of the artery after the angioplasty procedure to prevent restenosis. The use of placement techniques, such as balloons or mechanical expansions of the type often found to be useful in cardiac surgery, are relatively less useful in vasoocclusive surgery, particularly when tiny vessels, such as those found in the brain, are to be treated.

Other stents are self-expanding and are just deployed inside of the vascular. Their self-expanding nature allows them to be smaller as well as the devices to deploy them. There are different techniques to deploy the stents, and each has benefits and drawbacks. One expandable stent and delivery system is known that includes an expandable stent having proximal and distal anchor members mounted on proximal and distal legs extending proximally and distally from the stent. The proximal and distal anchor members of the expandable stent are mounted in gaps formed between proximal, intermediate and distal cylindrical members disposed on and spaced apart along an elongated core member. However, pushing the device distally in a catheter from the proximal end of the device is not optimal, because application of force in a distal direction on the proximal end of the stent can axially compress the stent, and can cause the stent to expand radially. Likewise, retracting the device proximally may not be optimal either, because application of force in a proximal direction on the distal end of the stent also can axially compress the stent, and can cause the stent to expand radially.

Some known implant deployment techniques utilize members extending from a delivery wire positioned outside the stent which push against the stent proximally or distally depending on distal or proximal placement of the members in relation to the stent. See, US Patent Nos. 6,123,723, 6,280,465, and US Publication No. 2011/0307049. Other techniques deploy the members inside of the stent. See, US Publication No. 2014/0277360, and US Patent Nos. 5,702,418, and 6,955,685, all of which are incorporated herein by reference. Such techniques may result in the members of the delivery system becoming caught on a deployed implant during extraction of the delivery wire and subsequently altering the position of the implant in the anatomy. Such techniques may also require several members which can increase the likelihood of altering the position of the implant during extraction of the delivery wire. Also, the more members on the delivery wire, the more difficult it may be to manufacture. In order to build the delivery system, a manufacturer can either secure polymer/metal sleeves onto a core wire, or grind down a core wire to create members on a wire. The more members on a delivery wire, the more material must be used to add and secure members, or, the more the grind profile has to change to accommodate all of the members.

More recently, a technique employing a dual function bump member disposed on a delivery wire and positioned within an implant, and a pusher bump member disposed on the delivery wire and positioned proximal the implant can deploy and retract the implant using only the two bump members on the delivery wire. See, US Publication No. 2018/0092766, incorporated herein by reference. While this solution can address the problems of other known techniques as discussed, the technique can require pushing or pulling the delivery wire over substantial lengths during deployment and repositioning of the implant. The dual function bump member can be positioned at the distal end of the implant during deployment and moved to the proximal end of the implant for extraction. Therefore, repositioning of the implant can involve subsequent distal and proximal movements of the delivery wire that are approximately equal to the length of the implant. Particularly for longer implants, this can increase the likelihood that deployed portions of the implant may be disturbed. Additionally, a length of delivery wire approximately equal to or longer than the stent may extend between the dual function bump and the distal coil so that the distal coil does not interfere with the deployed implant during retraction of the implant. In some treatments, a shorter extension of the distal coil may be desired.

Thus, it would be desirable to provide a delivery system for expandable stents that offers the flexibility of deploying and retracting the stent as desired with minimal travel of the delivery wire during deployment and retraction. Also desirable is a simplified manufacturing method. The solution of this disclosure solves these and other problems of the art.

Summary

An example of the delivery system described provides a solution for deploying and retracting stents utilizing at least three bump members including a distal, puller bump member positioned within the stent, an intermediate, retractor bump member positioned within the stent proximal the distal bump, and a proximal, pusher bump positioned proximal the stent. This disclosure provides a solution with a minimal number of delivery wire members that can be capable of deploying and repositioning long stents with minimal travel of the delivery wire.

An example of a braid implant delivery and retraction device having a catheter, an expandable element and a delivery wire with distal, pusher, and recapture bumps. The expandable element having compressed, partially delivered, and implanted configurations. Delivering the braid can include engaging the distal bump until the braid is in the partially delivered configuration. If the user needs to recapture the braid, the recapture bump engages the braid proximally. To fully implant the braid, the distal bump is used until the braid is partially delivered and then the distal bump disengages so that the pusher bump completes implanting by proximally pushing the braid completely out of the catheter.

An example of a vascular treatment apparatus can have a catheter with an inner lumen, an expandable element and a delivery wire. The expandable element including a proximal end, a distal end, a braided portion located between the proximal end and the distal end having a lumen therebetween, a proximal anchor member disposed at the proximal end, and a distal anchor member disposed at the distal end. The expandable element can have a compressed configuration dimensioned to fit within the inner lumen of the catheter; and a partially implanted configuration wherein the proximal end is dimensioned to fit within the inner lumen of the catheter and the distal end is dimensioned larger than the catheter.

In some examples, the delivery wire can be disposed within and extending through the inner lumen and the expandable element, and can include a proximal portion, a first intermediate portion located distal the proximal portion, a second intermediate portion located distal the first

intermediate portion, a distal portion located distal the second intermediate portion, a pusher bump member located adjacent the proximal portion and the first intermediate portion, a recapture bump member located adjacent the first intermediate portion and second intermediate portion, and a distal bump member located adjacent the second intermediate portion and the distal portion.

In some examples, the expandable element can be movable from the compressed configuration to the partially implanted configuration by a distal movement of the delivery wire causing the distal bump member of the delivery wire to engage with the distal anchor member of the expandable element and push the distal anchor member distally, thereby expelling the distal anchor member from the catheter, and the delivery wire is movable distally and proximally in relation to the expandable element in the partially implanted configuration.

An example of the expandable element can also be retractable from the partially implanted configuration by a proximal movement of the delivery wire causing the recapture bump member to engage with the proximal anchor member of the expandable element and push the proximal anchor member proximally, thereby retracting at least a portion of the expandable element into the catheter.

An example of the expandable element can be movable from the partially implanted configuration to an implanted configuration by a distal movement of the delivery wire causing the pusher bump member of the delivery wire to engage with the proximal anchor member of the expandable element and push the proximal anchor member distally, thereby expelling the proximal end of the expandable element from the catheter.

When the expandable element is in the compressed configuration and is positioned entirely within the inner lumen of the catheter, the distal bump member is positioned within the lumen of the braided portion of the expandable element, the recapture bump member is positioned within the lumen of the braided portion of the expandable element, and the proximal bump member is positioned proximal the proximal anchor member.

When the expandable element is in the partially implanted configuration, the distal end of the expandable element is positioned outside the catheter, the proximal end and the proximal anchor of the expandable element are positioned within the inner lumen of the catheter, and the recapture bump is movable to retract at least a portion of the expandable element into the lumen of the catheter. At least one of distal bump member, recapture bump member, and proximal

bump member comprise radio-opaque material and no more than one bump member is capable of engaging an anchor member at any time.

An example of the braided portion of the expandable element can be a plain weave, self-expanding and can at least occlude a neck of an aneurysm, and/or support embolic material within the aneurysm.

An example of a method of deploying an implant has steps of providing an implantation delivery system comprising a catheter, an expandable element, and a delivery wire; positioning a proximal anchor at a proximal end of the expandable element and positioning a distal anchor at a distal end of the expandable element. Positioning a distal bump on the delivery wire, positioning a recapture bump on the delivery wire proximal to the distal bump, positioning a proximal bump on the delivery wire proximal to the recapture bump, positioning the distal bump and the recapture bump within a lumen of the expandable element, positioning the proximal bump proximal to the expandable element, and positioning the expandable element and at least a portion of the delivery wire within a lumen of the catheter.

The method can also include partially implanting the expandable element, having steps of moving the distal anchor and the expandable element distally through the lumen of the catheter by pushing the delivery wire distally thereby pushing the distal bump against the distal anchor while the proximal bump and recapture bump remain disengaged from the expandable element, expelling the distal anchor from a distal end of the catheter by pushing the delivery wire distally thereby pushing the distal bump against the distal anchor while the proximal bump and recapture bump remain disengaged from the expandable element and expanding the expelled distal anchor, thereby disengaging the distal bump from the expandable element. In some examples, the method can include retracting at least a portion of the expandable element into the catheter can be accomplished by pulling the delivery wire proximally thereby pulling the recapture bump against the proximal anchor while the distal bump and the proximal bump remain disengaged from the expandable element.

In some examples, the method can include completing implantation of the expandable element, can have the steps of expelling the proximal anchor from the distal end of the catheter by pushing the delivery wire distally thereby disengaging the recapture bump from the expandable element and pushing the proximal bump against the proximal anchor; and expanding the expelled proximal anchor, thereby disengaging the proximal bump.

Another example of the method can have steps of moving the delivery wire independently from the expandable element while maintaining the proximal anchor within the lumen of the catheter and positioning the expandable element within a bodily lumen. The method can include the steps of positioning the expandable element to occlude the neck of an aneurysm and positioning the expandable element to support embolic material in the aneurysm.

An example of a stent implantation system can have a catheter; a braided stent can have a first expandable anchor at a distal end and a second expandable anchor at a proximal end, and the braided stent is movable in a compressed configuration through the catheter. Also, the braided stent is movable to a partially implanted configuration such that first expandable anchor is expanded in an implanted position distal to the catheter and the second expandable anchor is compressed within the catheter.

Another example of a delivery wire comprising a pusher bump, a puller bump, and a recapture bump, the delivery wire extends through the braided stent when the braided stent is in the compressed configuration and when the braided stent is in the partially implanted configuration. The pusher bump is positioned proximal the second expandable anchor when the braided stent is in the compressed configuration and when the braided stent is in the partially implanted configuration. The puller bump and the recapture bump are positioned within the braided stent when the braided stent is in the compressed configuration,

A distal movement of the delivery wire when the braided stent is in the compressed configuration pushes the puller bump against the first expandable anchor to move the expandable element distally while the pusher bump and recapture bump are disengaged from the expandable element. A distal movement of the delivery wire when the braided stent is in the partially implanted configuration pushes the pusher bump against the second expandable anchor to move the expandable element distally while the puller bump and recapture bump are disengaged from the expandable element. A proximal movement of the delivery wire when the braided stent is in the partially implanted configuration pulls the recapture bump against the second expandable anchor to move the expandable element proximally while the puller bump and pusher bump are disengaged from the expandable element.

An example of the system can have the first expandable anchor is sized larger than a diameter of puller bump when the braided stent is in the partially implanted configuration. Further, the first expandable anchor can be sized to remain anchored independent of any

movement of the puller bump when the braided stent is in the partially implanted configuration. Also, the first expandable anchor is freed from the puller bump when the braided stent is in the partially implanted configuration.

Brief Description of the Drawings

This disclosure is described with particularity in the appended claims. The above and further aspects of this disclosure may be better understood by referring to the following description in conjunction with the accompanying drawings, in which like numerals indicate like structural elements and features in various Figures. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the disclosure. The drawings depict one or more implementations in accord with the present teachings, by way of example only, not by way of limitation.

Figure 1 illustrates a cut-away view of an apparatus for delivering and releasing a expandable element to a treatment site in a patient's body lumen, according to an example of the disclosure;

Figures 2A to 2C illustrate extension and compression of an implant mesh;

Figures 3A and 3B illustrate extension and compression of an implant mesh within the catheter;

Figure 4 illustrates a braided implant according to an example of the disclosure; and

Figures 5A to 5H illustrate example steps for a method of use of an implantation system according to an example of the disclosure.

Figure 6 illustrates example steps for a method of use of an implantation system according to an example of the disclosure.

Detailed Description

In the following detailed description, numerous specific details are set forth by way of examples in order to provide a thorough understanding of the relevant teachings. However, it should be apparent to those skilled in the art that the present teachings may be practiced without such details. In other instances, well known methods, procedures, components, and/or circuitry have been described at a relatively high-level, without detail, in order to avoid unnecessarily obscuring aspects of the present teachings.

Examples of the present disclosure provides for a vascular treatment apparatus 100 that can deliver and release an expandable element 200 to a treatment site, including an aneurysm 20 in a patient's body lumen (e.g. vasculature) 10. As is illustrated in Figure 1, the apparatus 100 can include a catheter 102 comprising an inner lumen 104. The expandable element 200 has a proximal end 202, a distal end 204, a braided portion 206 located between the proximal end 202 and the distal end 204, and also forms a lumen therebetween. The expandable element 200 also includes a proximal anchor member 208 disposed at the proximal end 202, and a distal anchor member 210 disposed at the distal end 204. In certain examples, the proximal and distal anchors 208,210 face away from each other, the proximal anchor 208 facing the proximal end 202, and the distal anchor 210 facing the distal end 204. See, Figure 4.

The one or more anchor members 208, 210, can be projections which extend generally parallel to a longitudinal axis of the expandable element 200 and extend downward toward the longitudinal axis of the expandable element 200. The anchor members 208, 210 can serve as a radiopaque marker for improved visualization during the deployment of the expandable element 200 within the body lumen 10. The anchor members 208, 210 can be used to align the expandable element 200 so it can be pushed and pulled through the catheter 102 without damage or deformation. The anchor members 208, 210 can also be used to move the braided portion 206 into an expanded/implanted configuration. An example of the anchor member 208, 210 can be found in U.S. Serial No. 15/299,918, the entirety of which is incorporated herein by reference.

Typically, the expandable element 200 can have a compressed configuration and an expanded, implanted, configuration. In the compressed configuration the expandable element 200 can be dimensioned to fit within the inner lumen 104 of the catheter 102. In certain examples, the catheter 102 can aid in constraining the expandable element 200 so it does not expand when contained within the catheter 102. Other elements can be used to constrain the expandable element 200 as are known in the art.

The expandable element 200 can also have a partially implanted configuration where the proximal end 202 is dimensioned to fit within the inner lumen 104 of the catheter 102 and the distal end 204 is dimensioned larger than the catheter 102. See, e.g., Figure 5C.

Another element of the apparatus 100 is a delivery wire 106 disposed within and extending through the inner lumen 104 of both the catheter 102 and the expandable element 200. An example of the delivery wire 106 can have a proximal portion 108, a first intermediate

portion 109 located distal the proximal portion 108, a second intermediate portion 112 located distal of the first intermediate portion 109, and a distal portion 110 located distal of the second intermediate portion 112.

The delivery wire 106 can have a distal bump member 114, a recapture bump member 120, and a pusher bump member 116 extending radially outwardly from the delivery wire 106 and configured to engage the anchor members 208, 210 when the delivery wire 106 is translated longitudinally toward the anchor members 208, 210. One or all of the bump members 114, 116, 120 can be a radiopaque material to allow the location of the bumps 114, 116, 120 to be readily visible during an implanting procedure. The bumps 114, 116, 120 can be formed as larger diameter surfaces of the distal wire 106. They can be formed separately and added to the wire 106 or formed as the wire 106 is formed by selective addition or removal of material as the wire 106 is ground or laser cut. The bumps 114, 116, 120 can be any shape, as long as they can easily engage and disengage the expandable element 200.

The pusher bump member 116 can be located adjacent the proximal portion 108 and the first intermediate portion 109. The recapture bump member 120 can be located adjacent the first intermediate portion 109 and second intermediate portion 112. The distal bump member 114 can be located adjacent the second intermediate portion 112 and the distal portion 110. Force applied longitudinally to the delivery wire 106 can be transmitted through any of the bump members 114, 116 to the anchor members 208, 210 of the expandable element 200. This transfer of force can displace the expandable element 200 through the catheter 102 and the body lumen 10. In one example, no more than one bump member 114, 116, 120 is capable of engaging an anchor member 208, 210 at any time.

As noted above, the expandable element 200 can be moved from a compressed configuration illustrated in Figure 1 to a partially implanted configuration illustrated in Figure 5C. Distal movement of the delivery wire 106 can cause the distal bump member 114 of the delivery wire 106 to engage with the distal anchor member 210 of the expandable element 200 and push the distal anchor member 210 distally, thereby expelling the distal anchor member 210 from the catheter 102. The delivery wire 106 can be further capable of moving distally and proximally in relation to the expandable element 200 in the partially implanted configuration, as illustrated in Figure 5C.

During a procedure, if the user is dissatisfied with the placement of the expandable element 200, the expandable element 200 can be retracted back into the catheter 102 so it can be repositioned. Figure 5F illustrates a recapture of the expandable element 200 from the partially implanted configuration using a proximal movement of the delivery wire 106 causing the recapture bump member 120 to engage with the proximal anchor member 208 of the expandable element 200 and push the proximal anchor member 208 proximally, thereby retracting at least a portion of the expandable element 200 into the catheter 102.

In an example, during a procedure, once the user is satisfied with the expandable element's 200 placement, the expandable element 200 can be moved from the partially implanted configuration illustrated in Figure 5G to an implanted configuration illustrated in Figure 5H. Implanting the expandable element 200 can be done by a distal movement of the delivery wire 106 causing the pusher bump member 116 of the delivery wire 106 to engage with the proximal anchor member 208 of the expandable element 200 and push the proximal anchor member 208 distally. This expels the proximal end 202 of the expandable element 200 from the catheter 102.

In the expanded configuration, as illustrated in Figure 5H, the expandable element 200 expands radially to fit the vessel diameter of the patient's body lumen 10. The expanded dimension of the expandable element 200 allows the apparatus 100 to pass therethrough, to either advance to a second location or be withdrawn. The expandable element 200 can be expandable under its inherent properties, based at least on its original shape and the nature of the materials that make up the element. Examples of the expandable element 200 can be one of pear shaped, ovoid, elliptical and the like when at its expanded diameter. The construction of the expandable element 200 is known to those of skill in the art. Other embodiments are contemplated for expandable elements 200 of this disclosure and can also be observed in U.S. Pat. Pub. 2016/0058524, a reference that is incorporated in its entirety herein.

Figures 2A to 2C illustrate an example of a braided mesh that could be used to make an expandable element 200. If Figure 2A, the braid 300 is shown without any forces applied and it has a length L_1 , a diameter d_1 and the pores of the mesh have a particular angle θ_1 . Stationary angle θ_1 of the mesh is a feature that can determine the porosity of the braid 300 at that configuration. Figure 2B illustrates when a proximal "pushing" force is applied to the braid 300, whereby the "pushing" force is demonstrated with a proximal arrow applied to the braided mesh. With this force applied, the braid 300 has a tendency to "bunch" causing its diameter d_2 to

increase, while its “pushed” length L_2 is decreased. This also can increase the pore angle θ_2 . Thus, under “pushing” conditions, $L_1 > L_2$, $d_1 < d_2$, and $\theta_1 < \theta_2$. Figure 2C illustrates when a “pull” force is applied to a distal end of the braid 300, whereby the “pulling” force is demonstrated with a distal arrow applied away from the braided mesh. Here, the braid 300 extends (L_3) and its diameter d_3 shrinks in relation to the rest condition. The pore angle θ_3 is smaller, again changing the porosity of the braid 300. The relationships are now that $L_1 < L_3$, $d_1 > d_3$, and $\theta_1 > \theta_3$. In relation to each other $L_2 < L_1 < L_3$; $d_3 < d_1 < d_2$; $\theta_3 < \theta_1 < \theta_2$.

The above features of a braid 300 can then lead to difficulties in delivering it as the expandable member 200 through the catheter lumen 104. Figure 3A illustrates that as the braid 300 is pushed through the catheter 102, the expansion in diameter (d_2) can cause the braid 200 and the walls of the catheter lumen 104 to come into contact. This can increase the force needed to move the braid 300 through the catheter 102 to the aneurysm 20 and may damage the braid 300 during delivery. One solution can be to increase the diameter of the catheter to be greater than the “pushed” diameter d_2 , however this then limits the access of the catheter and braid to distal portions of the neurovascular. In these types of procedures, the smaller the diameter is more preferable.

A pulling force, however, as illustrated in Figure 3B can cause the braid 300 to be reduced to its “pulled” diameter d_3 which can be smaller than the diameter of the catheter lumen 104. This allows the braid 300 to travel through the catheter 102 with less friction and a reduced chance of damage to the braid 300 during delivery.

The braid 300/braided portion 206 of the expandable element 200 can be a plain weave and can be a self-expanding element. As illustrated in Figure 5H the braided portion 206 can occlude a neck of an aneurysm 20 and further, can support embolic material (not illustrated) within the aneurysm 20.

In certain examples, when expandable element 200 is in the compressed configuration it can be positioned entirely within the inner lumen 104 of the catheter 102. Then, the distal bump member 114 can be positioned within the lumen of the braided portion 206 of the expandable element 200, the recapture bump member 120 can be positioned within the lumen of the braided portion 206 of the expandable element 200, and the proximal bump member 116 can be positioned proximal the proximal anchor member 208. See, Figure 1

In certain examples where the expandable element 200 is in the partially implanted configuration, the distal end 204 of the expandable element 200 can be positioned outside the catheter 102, the proximal end 202 and the proximal anchor 208 of the expandable element 200 are positioned within the inner lumen 104 of the catheter 102, and the recapture bump 120 is movable to retract at least a portion of the expandable element 200 into the lumen 104 of the catheter 102.

As Figure 4 illustrates, when the expandable element 200 is in the (fully) implanted configuration, both anchors 208, 210 and the braided portion 206 are in their expanded position. Once implanted, the expandable element 200 can divert blood flow from the aneurysm 20, allowing it to gradually shrink. Diversion and/or shrinkage can reduce the chance of rupture, and thus, hemorrhagic stroke.

Figures 5A-5H and 6 illustrate an example of a method of deploying an implant. The steps can include providing an implantation delivery system 100 comprising a catheter 102, an expandable element 200, and a delivery wire 106 (Step 600), positioning a proximal anchor 208 at a proximal end 202 of the expandable element 200 (Step 602), and positioning a distal anchor 210 at a distal end 204 of the expandable element 200 (Step 604). A distal bump 114 can be positioned on the delivery wire 106 (Step 606), a recapture bump 120 can be positioned on the delivery wire 106 proximal to the distal bump 114 (Step 608); and a proximal bump 116 can be positioned on the delivery wire 106 proximal to the recapture bump 120 (Step 610). Positioning the distal bump 114 and the recapture bump 120 within a lumen of the expandable element 200 (Step 612), positioning the proximal bump 116 proximal to the expandable element 200 (Step 614), and positioning the expandable element 200 and at least a portion of the delivery wire 106 within a lumen 104 of the catheter 102 (Step 616).

Further steps include partially implanting the expandable element 200 (Step 650), which can have the steps of moving the distal anchor 210 and the expandable element 200 distally through the lumen 104 of the catheter 102 by pushing the delivery wire 106 distally thereby pushing the distal bump 114 against the distal anchor 210 while the proximal bump 116 and recapture bump 120 remain disengaged from the expandable element 200 (Step 652). Expelling the distal anchor 210 from a distal end of the catheter 102 by pushing the delivery wire 106 distally thereby pushing the distal bump 114 against the distal anchor 210 while the proximal bump 116 and recapture bump 120 remain disengaged from the expandable element 200 (Step

654) and expanding the expelled distal anchor 210, thereby disengaging the distal bump 114 from the expandable element 200 (Step 656).

In certain examples, the method can include the step of retracting at least a portion of the expandable element 200 into the catheter 102 by pulling the delivery wire 106 proximally thereby pulling the recapture bump 120 against the proximal anchor 208 while the distal bump 114 and the proximal bump 116 remain disengaged from the expandable element 200 (Step 658).

Completing implantation of the expandable element 200 (Step 670) can include expelling the proximal anchor 208 from the distal end of the catheter 102 by pushing the delivery wire 106 distally thereby disengaging the recapture bump 120 from the expandable element 200 and pushing the proximal bump 116 against the proximal anchor 208 (Step 672) and expanding the expelled proximal anchor 208, thereby disengaging the proximal bump 116 (Step 674).

Steps of other examples can include moving the delivery wire 106 independently from the expandable element 200 while maintaining the proximal anchor 208 within the lumen 104 of the catheter 102, positioning the expandable element 200 within a bodily lumen 10 to then occlude the neck of an aneurysm 20. Further including positioning the expandable element 200 to support embolic material in the aneurysm 20.

Another example of the present disclosures can be considered a stent implantation system having a catheter 102, a braided stent 200 with a first expandable anchor 210 at a distal end 204 and a second expandable anchor 208 at a proximal end 202. The braided stent 200 can be movable in a compressed configuration through the catheter 102 and can be movable to a partially implanted configuration such that first expandable anchor 210 is expanded in an implanted position distal to the catheter 102 and the second expandable anchor 208 is compressed within the catheter 102. A delivery wire 106 can include a pusher bump 116, a puller bump 114, and a recapture bump 120, and the delivery wire 106 extends through the braided stent 200 when the braided stent is in the compressed configuration and when the braided stent 200 is in the partially implanted configuration. The pusher bump 116 can be positioned proximal the second expandable anchor 208 when the braided stent 200 is in the compressed configuration and when the braided stent 200 is in the partially implanted configuration, and the puller bump 114 and the recapture bump 120 can be positioned within the braided stent 200 when the braided stent 200 is in the compressed configuration,

A distal movement of the delivery wire 106 when the braided stent 200 is in the compressed configuration pushes the puller bump 114 against the first expandable anchor 210 to move the expandable element 200 distally while the pusher bump 116 and recapture bump 120 are disengaged from the expandable element 200. The distal movement of the delivery wire 106 when the braided stent 200 is in the partially implanted configuration pushes the pusher bump 116 against the second expandable anchor 208 to move the expandable element 200 distally while the puller bump 114 and recapture bump 120 are disengaged from the expandable element 200. Also, a proximal movement of the delivery wire 106 when the braided stent 200 is in the partially implanted configuration pulls the recapture bump 120 against the second expandable anchor 208 to move the expandable element 200 proximally while the puller bump 114 and pusher bump 116 are disengaged from the expandable element.

In other examples, the first expandable anchor 210 can be sized larger than a diameter of puller bump 114 when the braided stent 200 is in the partially implanted configuration. Also, the first expandable anchor 210 can be sized to remain anchored independent of any movement of the puller bump 114 when the braided stent 200 is in the partially implanted configuration and the first expandable anchor 210 can be freed from the puller bump 114 when the braided stent 200 is in the partially implanted configuration.

Note that certain features of the apparatus 100 can be formed from materials that have a shape memory structure. For example, a metal alloy such as nickel titanium (NiTi), also known as Nitinol. Other elements may be formed of a non-superelastic material, such as spring steel or MP35N, an alloy of 35% nickel, 35% cobalt, 20% chromium, and 10% molybdenum, by weight. Features may be laser cut from the material, secure onto the delivery wire, or the delivery wire can be grinded down to create the above described elements.

While the foregoing has described what are considered to be the best mode and/or other examples, it is understood that various modifications may be made therein and that the subject matter disclosed herein may be implemented in various forms and examples, and that the teachings may be applied in numerous applications, only some of which have been described herein. It is intended by the following claims to claim any and all applications, modifications and variations that fall within the true scope of the present teachings.

What is Claimed is:

1. A vascular treatment apparatus, comprising:
 - a catheter comprising an inner lumen;
 - an expandable element comprising:
 - a proximal end;
 - a distal end;
 - a braided portion located between the proximal end and the distal end comprising a lumen therebetween;
 - a proximal anchor member disposed at the proximal end;
 - a distal anchor member disposed at the distal end;
 - wherein the expandable element comprises a compressed configuration dimensioned to fit within the inner lumen of the catheter; and
 - wherein the expandable element comprises a partially implanted configuration wherein the proximal end is dimensioned to fit within the inner lumen of the catheter and the distal end is dimensioned larger than the catheter; and
 - a delivery wire disposed within and extending through the inner lumen and the expandable element, comprising:
 - a proximal portion;
 - a first intermediate portion located distal the proximal portion;
 - a second intermediate portion located distal the first intermediate portion;
 - a distal portion located distal the second intermediate portion;
 - a pusher bump member located adjacent the proximal portion and the first intermediate portion;
 - a recapture bump member located adjacent the first intermediate portion and second intermediate portion; and
 - a distal bump member located adjacent the second intermediate portion and the distal portion,
 - wherein the expandable element is movable from the compressed configuration to the partially implanted configuration by a distal movement of the delivery wire causing the distal bump member of the delivery wire to engage with the distal anchor member of the expandable

element and push the distal anchor member distally, thereby expelling the distal anchor member from the catheter,

wherein the delivery wire is movable distally and proximally in relation to the expandable element in the partially implanted configuration, and

wherein the expandable element is retractable from the partially implanted configuration by a proximal movement of the delivery wire causing the recapture bump member to engage with the proximal anchor member of the expandable element and push the proximal anchor member proximally, thereby retracting at least a portion of the expandable element into the catheter.

2. The apparatus of claim 1 wherein the expandable element is movable from the partially implanted configuration to an implanted configuration by a distal movement of the delivery wire causing the pusher bump member of the delivery wire to engage with the proximal anchor member of the expandable element and push the proximal anchor member distally, thereby expelling the proximal end of the expandable element from the catheter.

3. The apparatus of claim 1 wherein,

the expandable element is in the compressed configuration and is positioned entirely within the inner lumen of the catheter,

the distal bump member is positioned within the lumen of the braided portion of the expandable element,

the recapture bump member is positioned within the lumen of the braided portion of the expandable element, and

the proximal bump member is positioned proximal the proximal anchor member.

4. The apparatus of claim 1 wherein,

the expandable element is in the partially implanted configuration,

the distal end of the expandable element is positioned outside the catheter,

the proximal end and the proximal anchor member of the expandable element are positioned within the inner lumen of the catheter, and

the recapture bump is movable to retract at least a portion of the expandable element into the lumen of the catheter.

5. The apparatus of claim 1 wherein at least one of the distal bump member, recapture bump member, and proximal bump member comprise radio-opaque material.
6. The apparatus of claim 1 wherein the braided portion of the expandable element is a plain weave.
7. The apparatus of claim 1 wherein the braid portion of the expandable element is a self-expanding element.
8. The apparatus of claim 1 wherein the braided portion occludes a neck of an aneurysm.
9. The apparatus of claim 1 wherein the braided portion supports embolic material within the aneurysm.
10. The apparatus of claim 1 wherein only one bump member is capable of engaging an anchor member at any time.
11. A method of deploying an implant comprising the steps of:
 - providing an implantation delivery system comprising a catheter, an expandable element, and a delivery wire;
 - positioning a proximal anchor at a proximal end of the expandable element;
 - positioning a distal anchor at a distal end of the expandable element;
 - positioning a distal bump on the delivery wire;
 - positioning a recapture bump on the delivery wire proximal to the distal bump;
 - positioning a proximal bump on the delivery wire proximal to the recapture bump;
 - positioning the distal bump and the recapture bump within a lumen of the expandable element;
 - positioning the proximal bump proximal to the expandable element;

positioning the expandable element and at least a portion of the delivery wire within a lumen of the catheter;

partially implanting the expandable element, comprising the steps of:

moving the distal anchor and the expandable element distally through the lumen of the catheter by pushing the delivery wire distally thereby pushing the distal bump against the distal anchor while the proximal bump and recapture bump remain disengaged from the expandable element;

expelling the distal anchor from a distal end of the catheter by pushing the delivery wire distally thereby pushing the distal bump against the distal anchor while the proximal bump and recapture bump remain disengaged from the expandable element; and

expanding the expelled distal anchor, thereby disengaging the distal bump from the expandable element;

retracting at least a portion of the expandable element into the catheter by pulling the delivery wire proximally thereby pulling the recapture bump against the proximal anchor while the distal bump and the proximal bump remain disengaged from the expandable element; and

completing implantation of the expandable element, comprising the steps of:

expelling the proximal anchor from the distal end of the catheter by pushing the delivery wire distally thereby disengaging the recapture bump from the expandable element and pushing the proximal bump against the proximal anchor; and

expanding the expelled proximal anchor, thereby disengaging the proximal bump.

12. The method of claim 11 further comprising the step of moving the delivery wire independently from the expandable element while maintaining the proximal anchor within the lumen of the catheter.

13 The method of claim 11 further comprising the step of positioning the expandable element within a bodily lumen.

14. The method of claim 11 further comprising the step of positioning the expandable element to occlude the neck of an aneurysm.

15. The method of claim 14 further comprising the step of positioning the expandable element to support embolic material in the aneurysm.

16. A stent implantation system comprising:

a catheter;

a braided stent comprising a first expandable anchor at a distal end and a second expandable anchor at a proximal end,

wherein the braided stent is movable in a compressed configuration through the catheter, and

wherein the braided stent is movable to a partially implanted configuration such that first expandable anchor is expanded in an implanted position distal to the catheter and the second expandable anchor is compressed within the catheter; and

a delivery wire comprising a pusher bump, a puller bump, and a recapture bump,

wherein the delivery wire extends through the braided stent when the braided stent is in the compressed configuration and when the braided stent is in the partially implanted configuration,

wherein the pusher bump is positioned proximal the second expandable anchor when the braided stent is in the compressed configuration and when the braided stent is in the partially implanted configuration,

wherein the puller bump and the recapture bump are positioned within the braided stent when the braided stent is in the compressed configuration,

wherein a distal movement of the delivery wire when the braided stent is in the compressed configuration pushes the puller bump against the first expandable anchor to move the expandable element distally while the pusher bump and recapture bump are disengaged from the expandable element,

wherein a distal movement of the delivery wire when the braided stent is in the partially implanted configuration pushes the pusher bump against the second expandable anchor to move the expandable element distally while the puller bump and recapture bump are disengaged from the expandable element, and

wherein a proximal movement of the delivery wire when the braided stent is in the partially implanted configuration pulls the recapture bump against the second expandable anchor to move the expandable element proximally while the puller bump and pusher bump are disengaged from the expandable element.

17. The system of claim 16 wherein the first expandable anchor is sized larger than a diameter of puller bump when the braided stent is in the partially implanted configuration.

18. The system of claim 16 wherein the first expandable anchor is sized to remain anchored independent of any movement of the puller bump when the braided stent is in the partially implanted configuration.

19. The system of claim 16 wherein the first expandable anchor is freed from the puller bump when the braided stent is in the partially implanted configuration.

ABSTRACT

A braid implant delivery and retraction device having a catheter, an expandable element and a delivery wire with distal, pusher, and recapture bumps. The expandable element having compressed, partially delivered, and implanted configurations. Delivering the braid can include engaging the distal bump till the braid is in the partially delivered configuration. If the user needs to recapture the braid, the recapture bump engages the braid proximally. To fully implant the braid, the distal bump is used until the braid is partially delivered and the distal bump disengages, now the pusher bump completes implanting by proximally pushing the braid completely out of the catheter.

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Application Number: Not Yet Assigned
Filing Date: Filed Concurrently Herewith
First Named Inventor: Robert SLAZAS
Title: BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT
Art Unit: Not Yet Assigned
Examiner Name: Not Yet Assigned
Attorney Docket Number: 243382.000144

SIGNATURE of Applicant or Patent Practitioner

Signature: /Louis J. DelJuidice - 47,522/
Date (Optional): 2018-08-06
Name: Louis John DelJuidice
Registration Number: 47522
Title (if Applicant is a juristic entity):

Applicant Name (if Applicant is a juristic entity): DePuy Synthes Products, Inc.

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

*Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 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) 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 3 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.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number
Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

06980

OR

I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

The address associated with the above-mentioned Customer Number

OR

The address associated with Customer Number:

OR

Firm or Individual Name
Address
City
State
Zip
Country
Telephone
Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

DEPUY SYNTHES PRODUCTS, INC.

- Inventor or Joint Inventor (title not required below)
Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature
Date (Optional)
Name
Title

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 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) 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 3 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.

FIG. 1

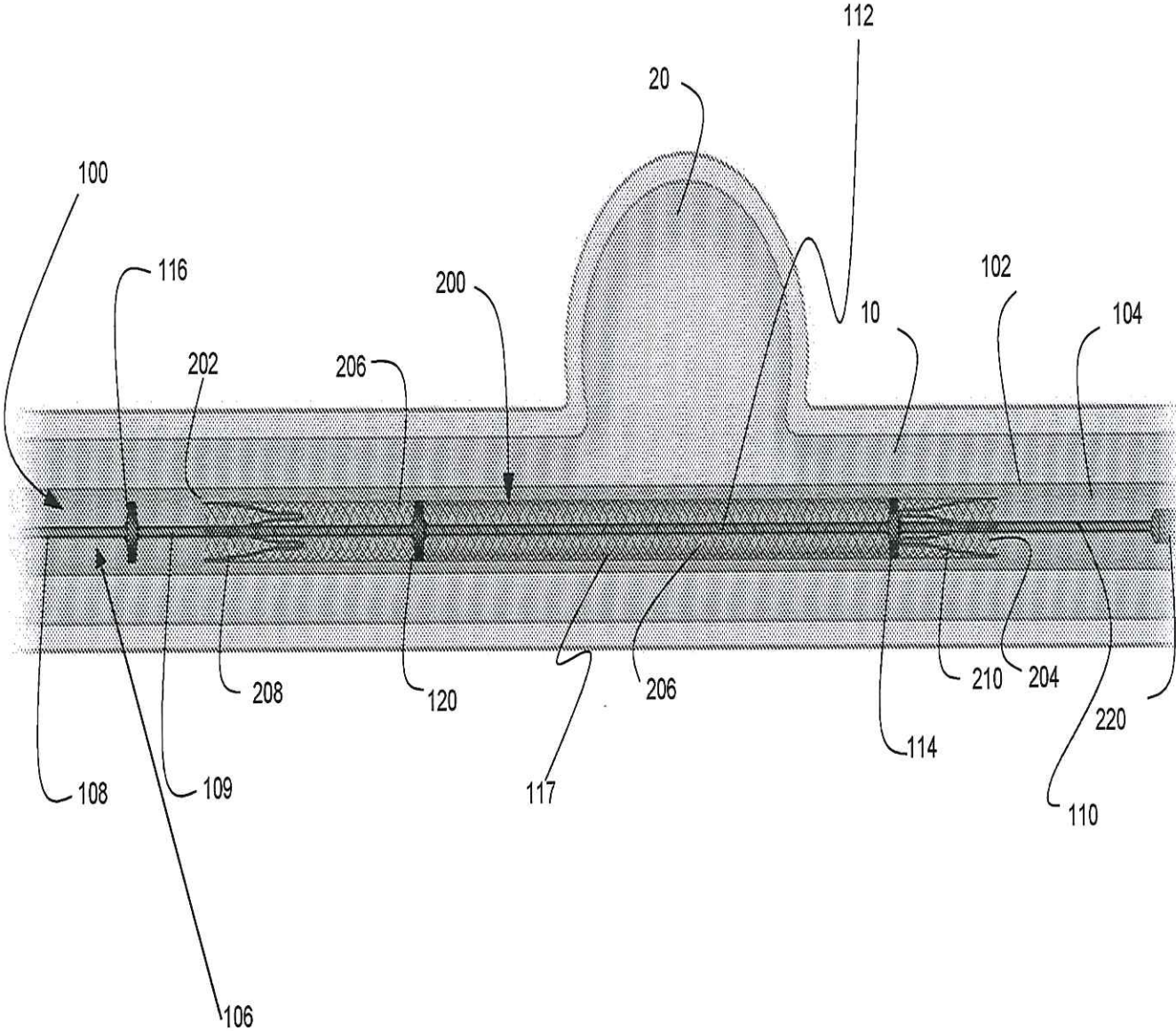


FIG. 2A

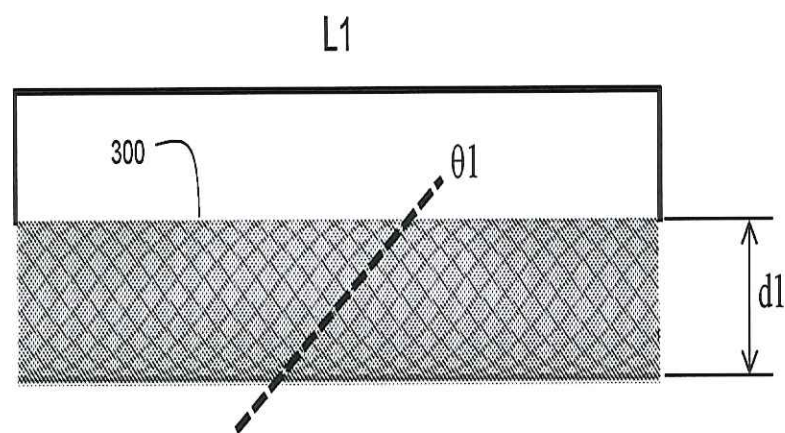


FIG. 2B

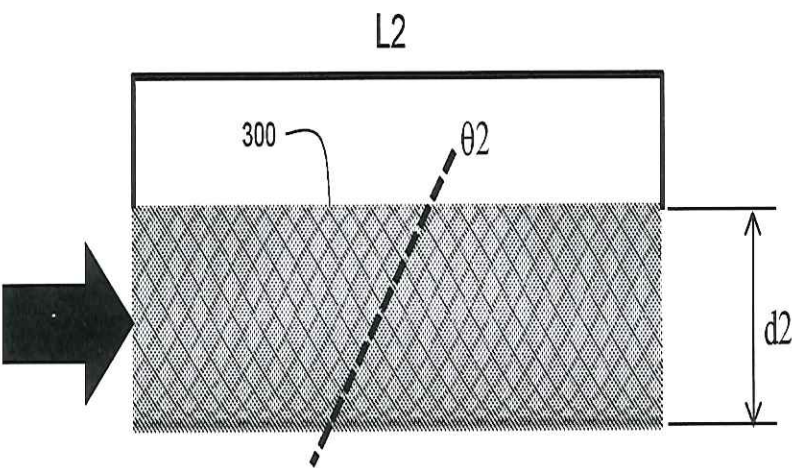


FIG. 2C

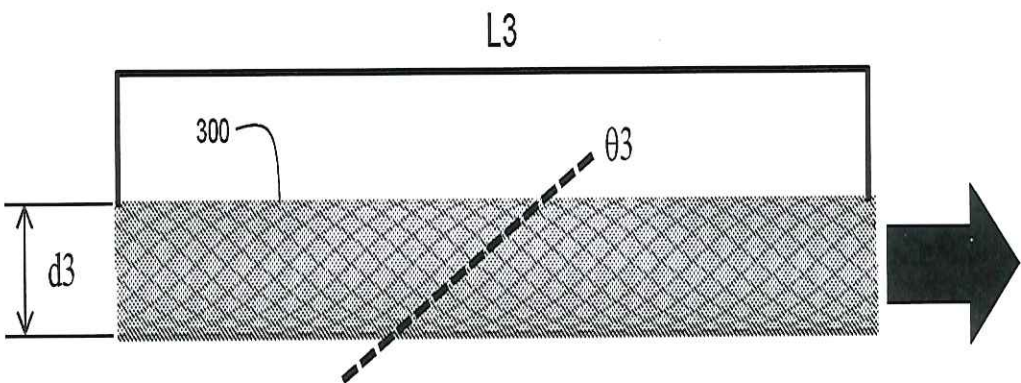


FIG. 3A

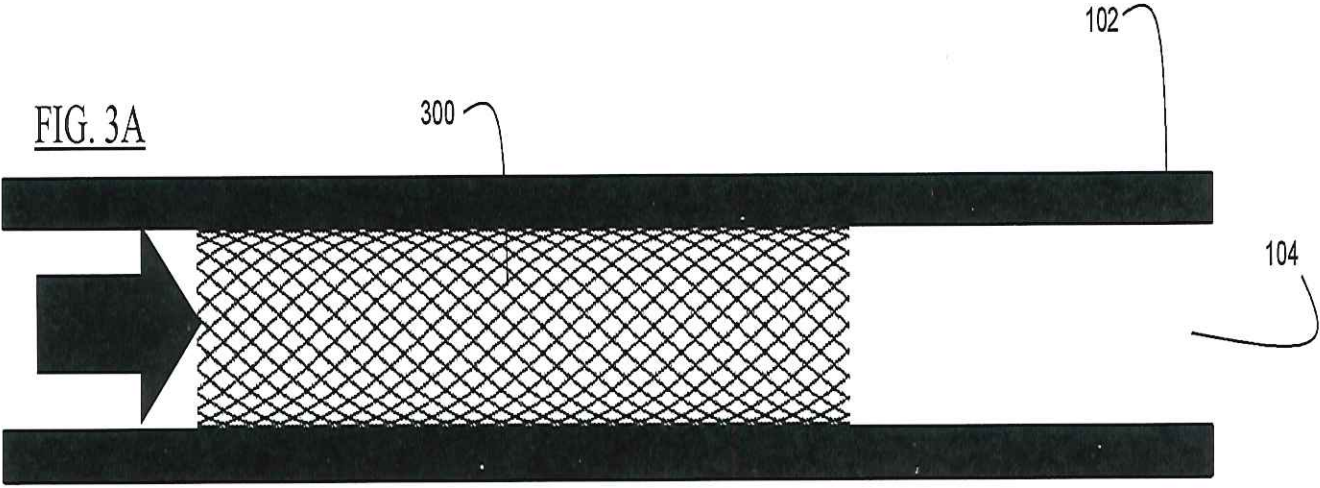
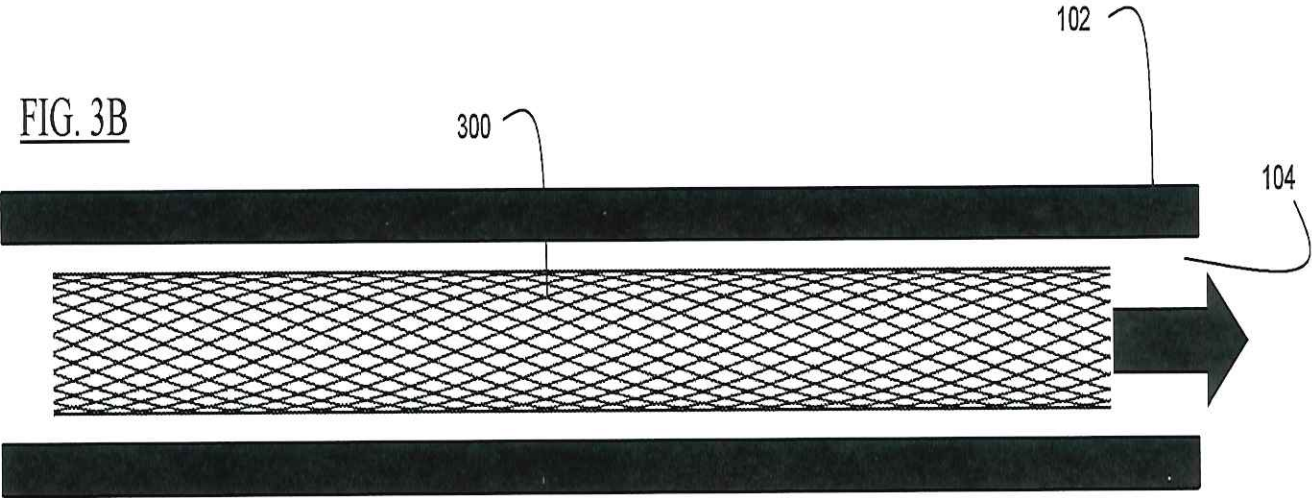


FIG. 3B



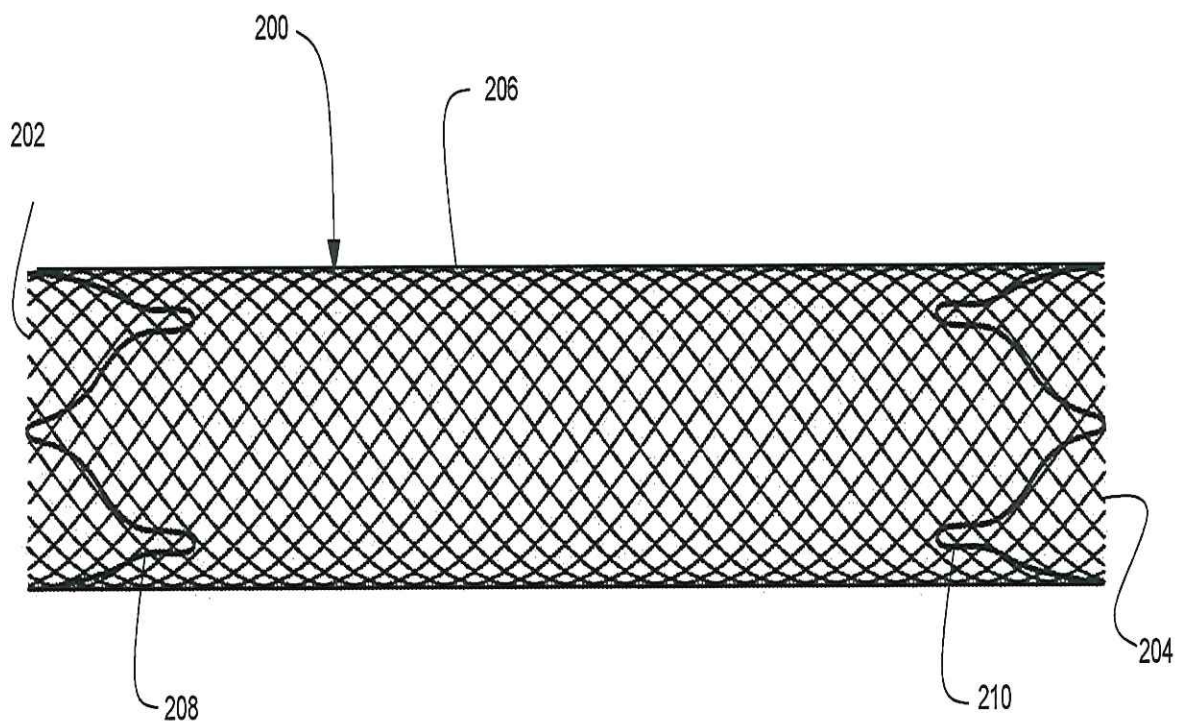


FIG. 4

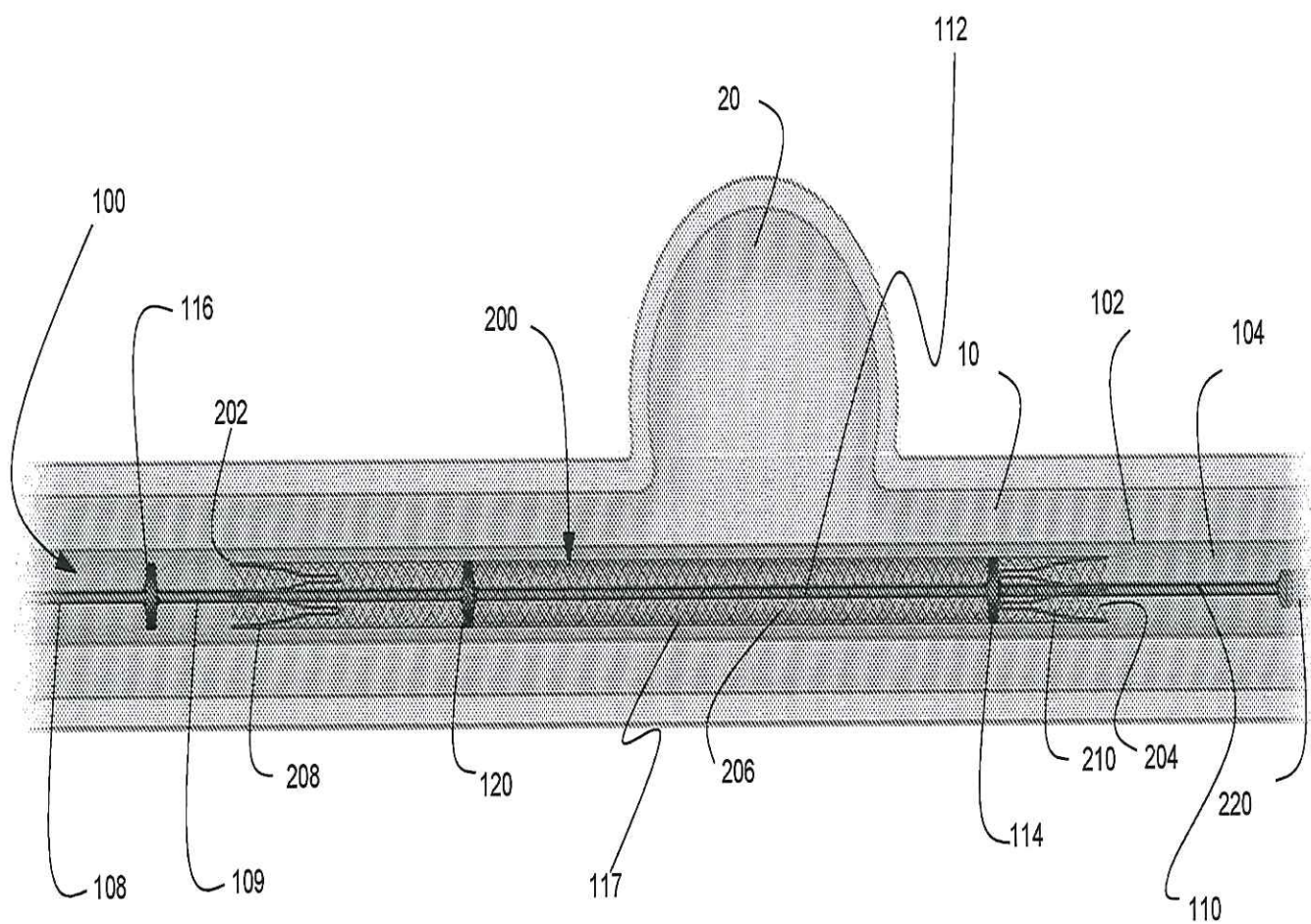


FIG. 5A

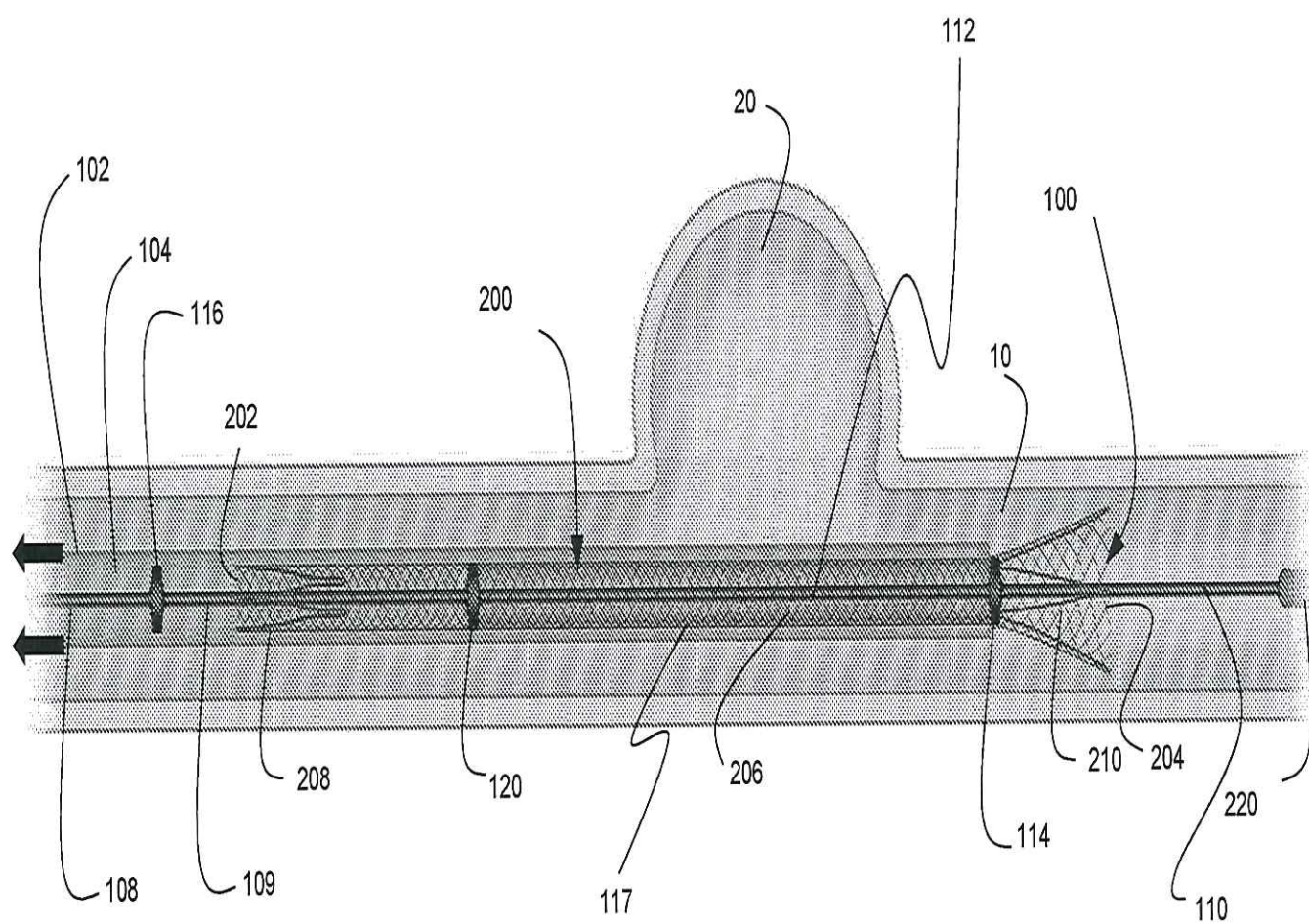


FIG. 5B



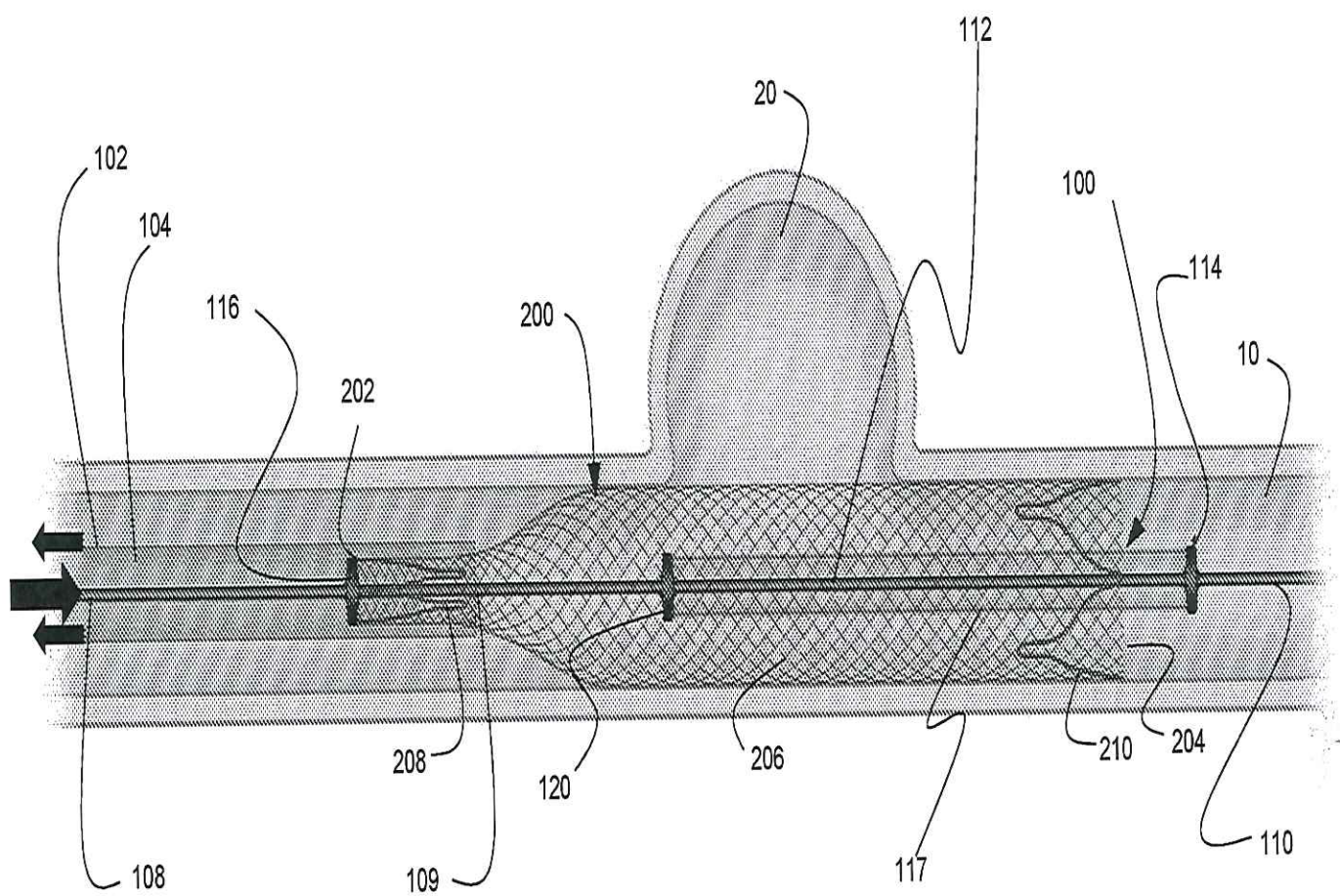


FIG. 5D

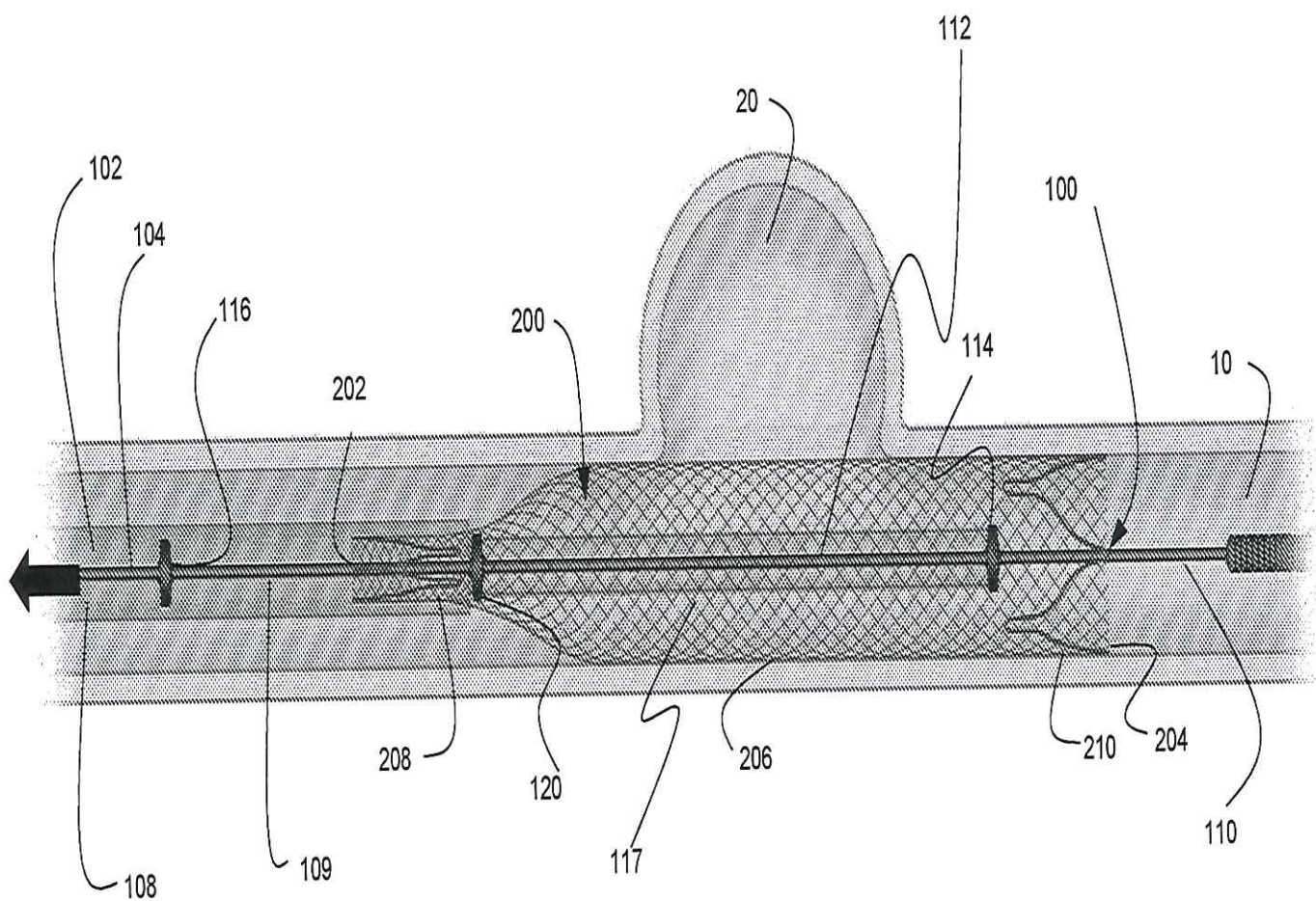


FIG. 5E

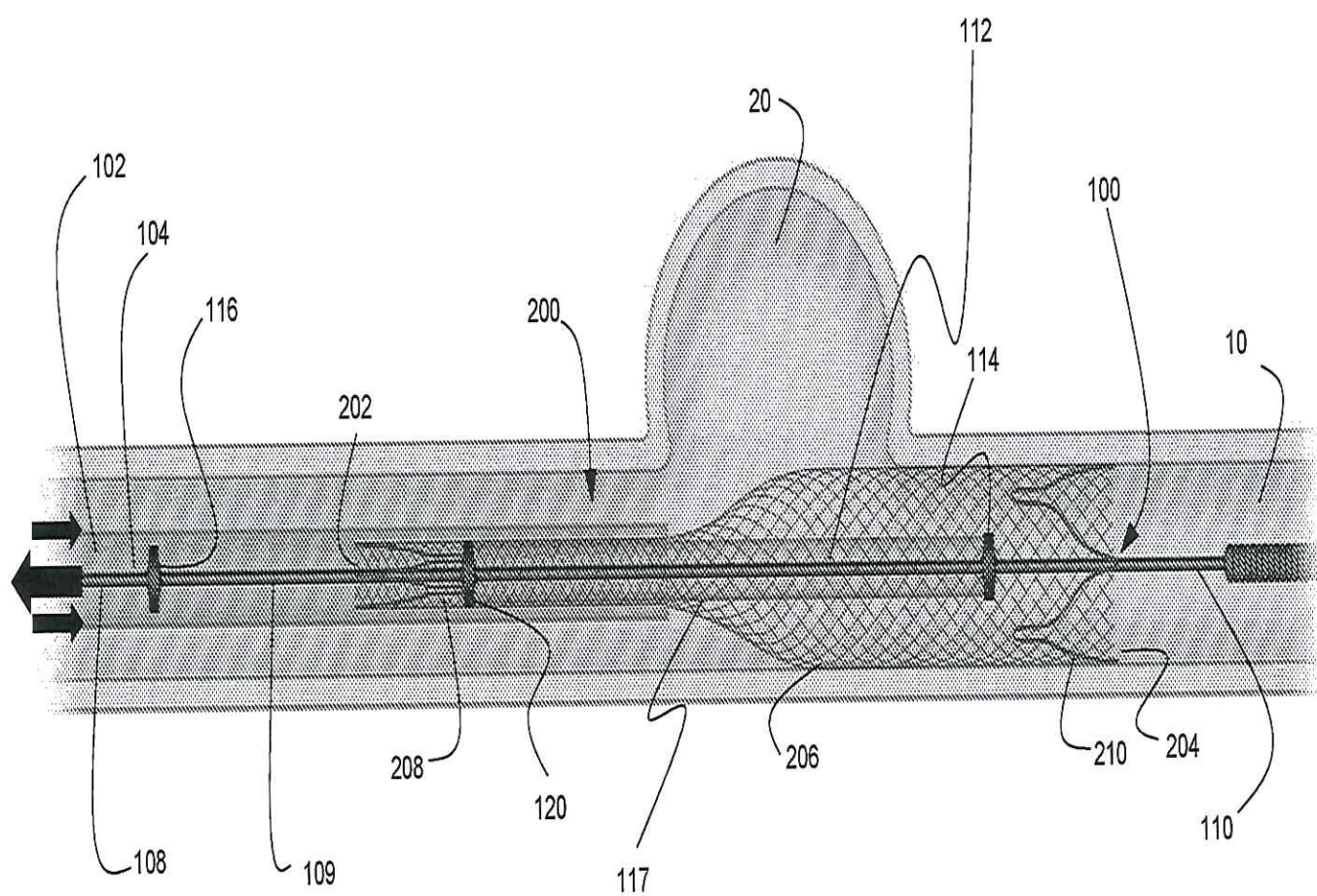


FIG. 5F

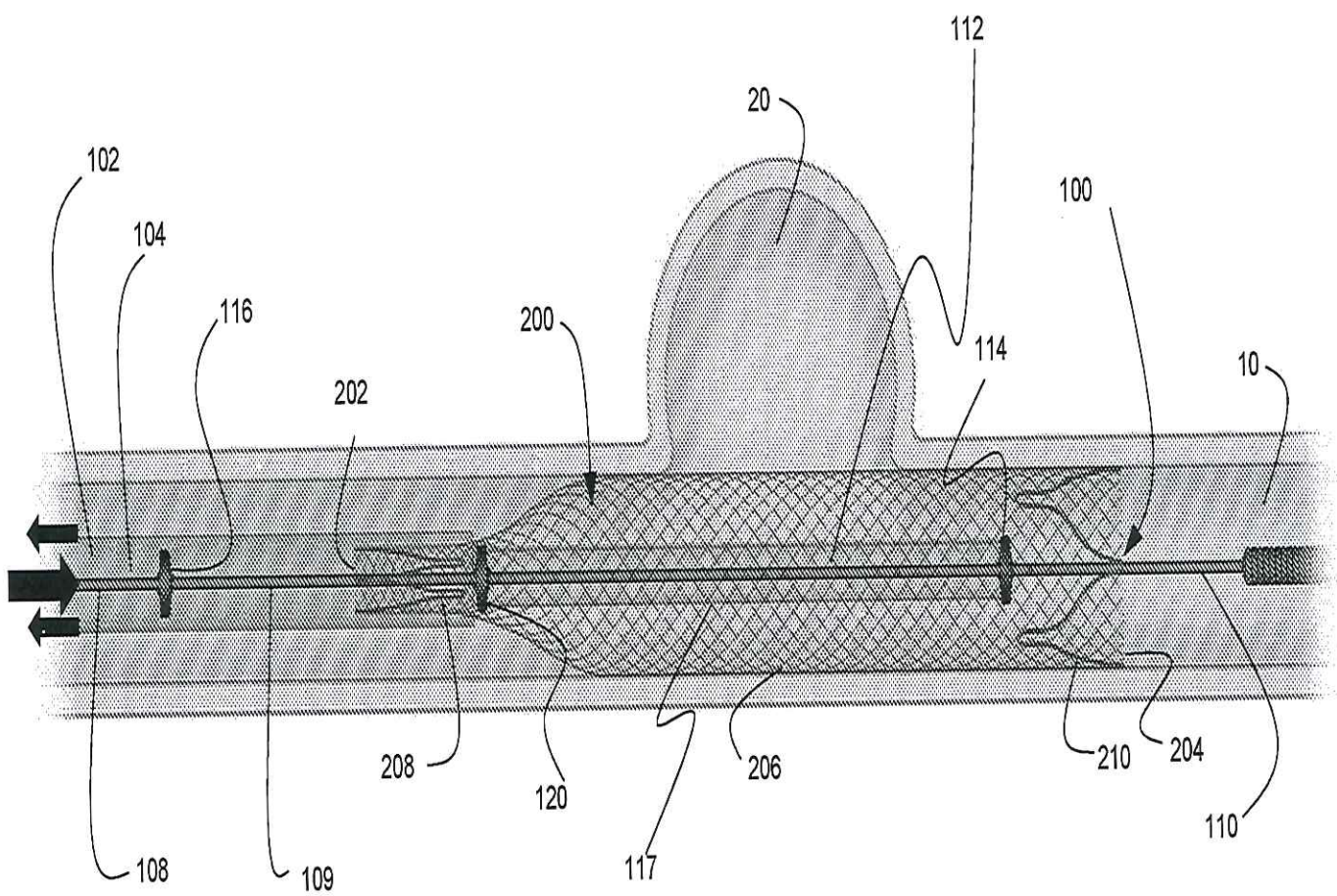


FIG. 5G

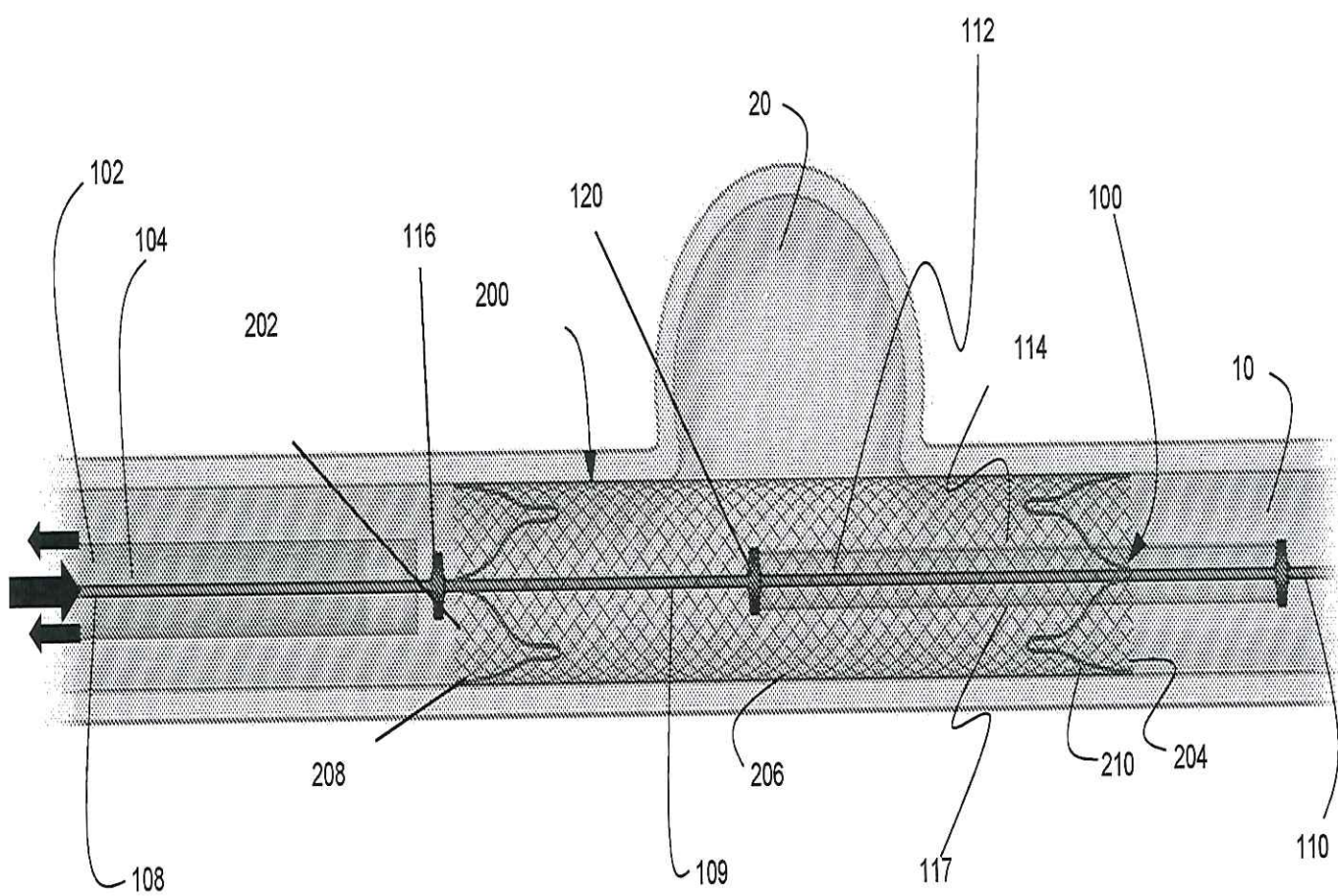
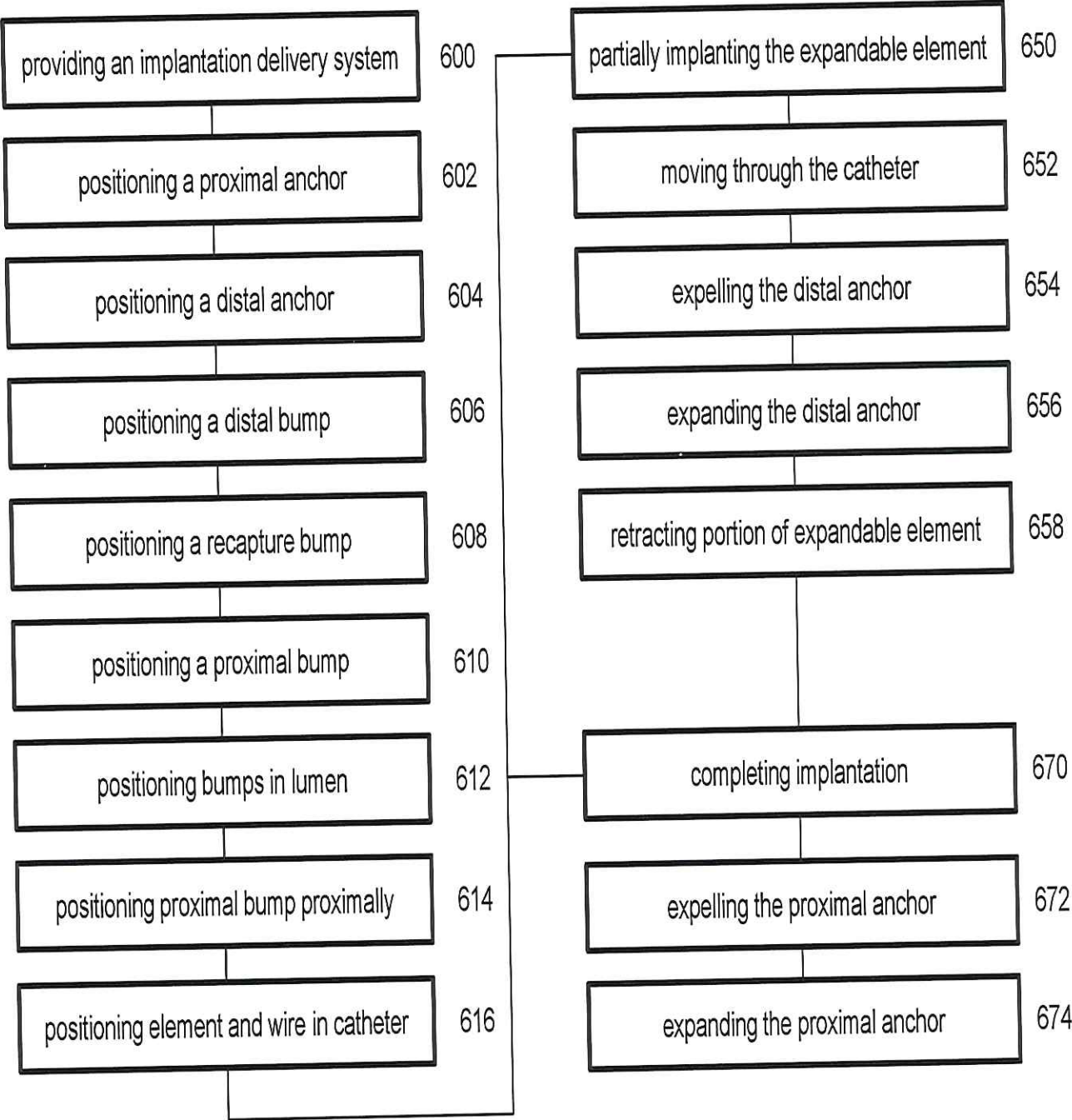


FIG. 5H

FIG. 6



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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382.000144
		Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT		
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		SLAZAS	

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

City	Raynham	State/Province	MA	Country of Residence	US
------	---------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	c/o DePuy Synthes Products, Inc.				
Address 2	325 Paramount Drive				
City	Raynham	State/Province	MA	Postal Code	02767
		Country i	US		

Inventor 2

Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Juan		LORENZO	

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

City	Raynham	State/Province	MA	Country of Residence	US
------	---------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	c/o DePuy Synthes Products, Inc.				
Address 2	325 Paramount Drive				
City	Raynham	State/Province	MA	Postal Code	02767
		Country i	US		

Inventor 3

Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Lacey		GOROCHOW	

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

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382.000144
		Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT		

City	Raynham	State/Province	MA	Country of Residence	US
------	---------	----------------	----	----------------------	----

Mailing Address of Inventor:					
Address 1		c/o DePuy Synthes Products, Inc.			
Address 2		325 Paramount Drive			
City	Raynham	State/Province	MA		
Postal Code	02767	Country	US		
Inventor	4	Remove			

Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Pedro		PEDROSO		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Raynham	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:					
Address 1		c/o DePuy Synthes Products, Inc.			
Address 2		325 Paramount Drive			
City	Raynham	State/Province	MA		
Postal Code	02767	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	06980		
Email Address	IPServicesNYC@troutmansanders.com	Add Email	Remove Email

Application Information:

Title of the Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT		
Attorney Docket Number	243382.000144	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	13	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	243382.000144
	Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT	

Filing By Reference:

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	06980		

Domestic Benefit/National Stage Information:

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

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)

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

Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	243382.000144
	Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT	

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).

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

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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	243382.000144
	Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT	

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382.000144
		Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT		

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	DePuy Synthes Products, Inc.	
Mailing Address Information For Applicant:		
Address 1	325 Paramount Drive	
Address 2		
City	Raynham	State/Province MA
Country	US	Postal Code 02767
Phone Number		Fax Number
Email Address		
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

Assignee Information including Non-Applicant Assignee Information:

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

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	243382.000144
	Application Number	
Title of Invention	BRAID IMPLANT DELIVERY AND RETRACTION DEVICE WITH DISTAL ENGAGEMENT	

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	DePuy Synthes Products, Inc.		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	325 Paramount Drive		
Address 2			
City	Raynham	State/Province	MA
Country i	US	Postal Code	02767
Phone Number		Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add			

Signature:

Remove

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

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

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

Signature	/Louis J. DeJuidice - 47,522/			Date (YYYY-MM-DD)	2018-08-06
First Name	Louis John	Last Name	DeJuidice	Registration Number	47522
Additional Signature may be generated within this form by selecting the Add button.					Add

Privacy Act Statement

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

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

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

P-2019/36068

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIRECCIÓN DE NUEVAS CREACIONES

E. S. D.

Ref.: Expediente No. **NC2019/0008570**

Solicitud de registro de patente de invención a nombre de **DEPUY SYNTHES PRODUCTS, INC.**

Yo, CAROLINA DAZA MONTALVO, identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 No. 86-53, piso 3, obrando **DEPUY SYNTHES PRODUCTS, INC.**, me permito dar respuesta al Oficio No. 8188 del 12 de agosto de 2019, de la siguiente manera

- 1. Prioridad:** Adjuntamos a la presente comunicación el documento de prioridad junto con su traducción.

Habiendo dado cumplimiento al requerimiento de este Despacho, solicito respetuosamente se continúe con el trámite de la referencia.

Atentamente,



CAROLINA DAZA MONTALVO

C.C. 66.783.790 de Palmira Valle

TP-141563 CSJ

notificaciones@clarkemodet.com.co