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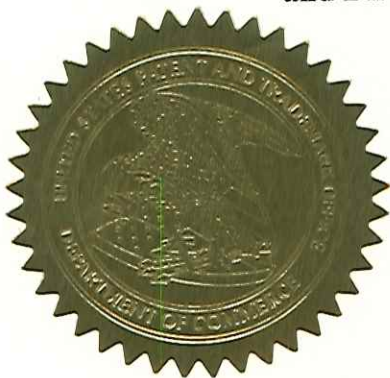
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	Transmittal_AF_2018-08-08_DE PUY122.pdf	283025	no	1
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3		SpecificationAF_2018-08-08_DEPUY122.pdf	128575	yes	23
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4	Drawings-only black and white line drawings	Drawings_AF_2018-08-08_DEPUY122.pdf	4325863	no	10
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5	Oath or Declaration filed	Declaration_AF_2018-08-08_DEPUY122.pdf	56801	no	1
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6	Power of Attorney	POA_AF_2018-08-08_DEPUY122.pdf	694039 3d4cb3454e1bd036b21b682f5bcee3d9a3499a71	no	2
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7	Fee Worksheet (SB06)	fee-info.pdf	35108 bbf065d9697ba26cf0cdab5b407bb85ed9f00ed9	no	2
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UTILITY PATENT APPLICATION TRANSMITTAL		Attorney Docket No. 243382-000122	
		First Named Inventor Lacey GOROCHOW	
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APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>		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 23] 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 10] 6. ☐ Inventor's Oath or Declaration [Total Pages 1] (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		10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement (when there is an assignee) ☒ Power of Attorney 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: _____	
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DELIVERY SYSTEM FOR EMBOLIC BRAID

Field of Invention

This disclosure relates to medical instruments, and more particularly, delivery systems for a device for aneurysm therapy.

Background

Aneurysms can be complicated and difficult to treat. For example, treatment access can be limited or unavailable when an aneurysm is located proximate critical tissues. Such factors are of concern with cranial aneurysms due to the presence of brain tissue surrounding cranial vessels.

Prior solutions have included endovascular treatment access whereby an internal volume of the aneurysm sac is removed or excluded from arterial blood pressure and flow. Alternative to endovascular or other surgical approaches can include occlusion devices that either fill the sac of the aneurysm with embolic material to create a thrombotic mass or to treat the entrance (or neck) of the aneurysm to minimize the blood flow across the entrance, induce venous stasis in the aneurysm, and facilitate a natural formation of a thrombotic mass within the aneurysm. Such devices typically utilize multiple embolic coils to either fill the sac or treat the entrance.

Obtaining a packing density sufficient to occlude an aneurysm by packing the aneurysm sac with embolic coils is difficult, time consuming, and aneurysm morphology (e.g. wide neck, bifurcation, etc.), and the like required ancillary devices such as stents or balloons to support the coil mass and obtain the desired packing density.

Naturally formed thrombotic masses formed by treating the entrance of the aneurysm with embolic coils can improve healing compared to aneurysm masses packed with embolic coils by reducing possible distention from arterial walls and permitting reintegration into the original parent

vessel shape along the neck plane. However, embolic coils delivered to the neck of the aneurysm can potentially have the adverse effect of impeding the flow of blood in the adjoining blood vessel; at the same time, if the entrance is insufficiently packed, blood flow can persist into the aneurysm.

Furthermore, embolic coils do not always effectively treat aneurysms as aneurysms treated with multiple coils often recanalize or compact because of poor coiling, lack of coverage across the aneurysm neck, blood flow, or even aneurysm size.

Several examples of an occlusion device are described in U.S. Pat. No. 8,998,947. However, this approach relies upon the use of embolic coils or mimics the coil approach to obtain a safe packing density and therefore unnecessarily risks rupture of the aneurysm. Furthermore, this approach fails to teach a delivery system whereby an occlusion device can be re-positioned after initial positioning of its aneurysm occlusion structure to ensure patient safety associated with precise positioning.

It is therefore desirable to have a device which easily, accurately, and safely occludes a neck of an aneurysm or other arterio-venous malformation in a parent vessel without blocking flow into perforator vessels communicating with the parent vessel.

Further, once deployed into the aneurysm, the surgeon requires positive confirmation that the device has been positively released. Certain prior art release mechanisms have difficulties detaching, leading to misplacement of the device.

Summary

Disclosed herein are various exemplary devices and systems of the present invention that can address the above needs. The devices generally can include a braided implant attached to a releasing component that can be detachably engaged with a delivery tube and a pull wire. The

releasing component can engage the delivery tube in a compressed configuration and can disengage the delivery tube by expanding to a released or deployed configuration. The pull wire can have an extending portion that can engage the releasing component and an elongated portion that can be pulled to disengage the releasing component. The braided implant, once implanted, can be released from the delivery tube by disengaging the pull wire from the releasing component and disengaging the releasing component from the delivery tube.

In one example, a system can include a braided implant, a delivery tube, a releasing component, and a pull wire. The delivery tube can have a lumen therethrough, a distal end, an outer surface, and a channel on the outer surface. The releasing component can have a band and a spring member attached to the band. The band can be attached to a first portion of the braided implant, and the spring member can be movable from a compressed configuration that presses the outer surface of the delivery tube and an extended configuration that extends away from the outer surface of the delivery tube. The pull wire can be positioned within the channel of the delivery tube and can be movable from an engaging configuration to a releasing configuration. The engaging configuration can engage the releasing component, and the releasing configuration can allow the spring member to expand to its extended configuration.

The braided implant can have a first portion and a second portion separated by a fold. The first portion can encompass a portion of the outer surface of the distal end of the delivery tube. The second portion can have an elongated tubular structure and can be positioned within the lumen of the delivery tube.

The pull wire can have an extending portion and an elongated portion, and a movement of the elongated portion can move the extending portion from the engaging configuration to the releasing configuration. The pull wire can be fastened to the channel of the delivery tube with an

adhesive, and the movement of the elongated portion can break the adhesive to unfasten the pull wire.

The system can include an affixing component that affixes the braided implant to the outer surface of the band of the releasing component. The affixing component can include a lumen therethrough. The lumen can encompass the band of the releasing component.

The spring member can be an elongated member having a proximal end and a distal end. The proximal end can attach to a distal surface of the band of the releasing component. The distal end can press the outer surface of the delivery tube in the compression configuration, and the distal end can extend away from the outer surface of the delivery tube in the extended configuration.

The releasing component can have an occlusion member attached to the band that can be movable from a delivery configuration to a deployed configuration. The delivery configuration can extend longitudinally along the outer surface of the delivery tube, and the deployed configuration can at least partially obstruct the lumen of the band.

The releasing component can be composed of a radiopaque material.

An example device for treating an aneurysm can have a tubular delivery member, a braided tubular implant, a releasing component, and a bending member. The tubular delivery member can have a distal delivery end, an interior, and an exterior. The braided tubular implant can have a distal implant end that can extend outward from the distal delivery end of the tubular delivery member and fold proximally over a portion of the exterior of the tubular delivery member. The braided tubular implant can have a proximal implant end that can be positioned within the interior of the tubular delivery member. The releasing component can be attached to the distal implant end of the braided implant and detachably attached to the exterior of the tubular delivery member near the distal delivery end. The bending member can be positioned near the distal delivery end

of the tubular delivery member. The bending member can have a bent configuration and a straight configuration. The bent configuration can engage a distal surface of the releasing component, and the straight configuration can disengage the distal surface of the releasing component.

The releasing component can have an attached configuration and a deployed configuration. The attached configuration can engage the exterior of the tubular delivery member, and the deployed configuration can disengage the exterior of the tubular delivery member.

The deployed configuration can at least partially occlude the lumen of the band of the releasing component.

The bending member can be the extending portion of a pull wire, and a movement of an elongated portion of the pull wire can move the extending portion from the bent configuration to the straight configuration. The pull wire can be positioned within a channel on the exterior of the tubular delivery member. The pull wire can be fastened to the tubular delivery member with an adhesive, and the movement of the elongated portion can break the adhesive to unfasten the pull wire.

An example method for releasing an implant at an aneurysm treatment site can include the steps of providing a braided implantation delivery system, engaging a pull wire of the delivery system to a releasing component of the delivery system, engaging the releasing component to a delivery tube of the delivery system, implanting a braided implant of the delivery system at the treatment site, pulling the pull wire to disengage from the releasing component, disengaging the releasing component from the delivery tube, and releasing the releasing component from the delivery tube thereby releasing the braided implant from the delivery tube.

The step of releasing the releasing component can include the step of moving a spring member of the releasing component from an engaged configuration engaging an outer surface of

the delivery tube to a released configuration extending away from the outer surface of the delivery tube.

The step of implanting the braided implant can include forming an occlusive sack by inverting a portion of the braided implant.

The method can include the step of fastening the pull wire to the delivery tube with an adhesive. The step of pulling the pull wire can include the step of breaking the adhesive.

The method can include the step of moving a movable member of the releasing component to at least partially occlude a lumen of the releasing component.

Brief Description of the Drawings

The above and further aspects of this invention are further discussed with reference 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 principles of the invention. The figures depict one or more implementations of the inventive devices, by way of example only, not by way of limitation.

Fig. 1a is an exploded view depicting components of an exemplary device of the present invention;

Fig. 1b is a cut-away view of an exemplary device of the present invention;

Fig. 1c is a cross-sectional view of an exemplary device of the present invention

Figs. 2a to 2g illustrate a method of use of a device of the present invention;

Figs. 3a and 3b are a cut-away views illustrating a braided implant at various stages of implantation in an aneurysm according to the present invention;

Figs. 4a to 4c illustrate a releasing component according to the present invention;
Fig. 5a is a cut-away view of an exemplary device of the present invention;
Fig. 5b is a cross-sectional view of an exemplary device of the present invention;
Figs. 6 is a cross-sectional view of an exemplary device of the present invention;
Figs. 7a to 7c are cut-away views of an exemplary device at various stages of implantation according to the present invention; and

Figs. 8 and 9 are flow diagrams outlining example method steps for use of a device according to the present invention.

Detailed Description

Previous approaches utilizing embolic coils can be improved upon by treating the aneurysm entrance and/or packing the aneurysm with an embolic braided implant. For example, see U.S. Patent Application Number 15/903,860, incorporated herein by reference. Treating the aneurysm with the braided implant can have potential advantages over treatments utilizing embolic coils such as a higher packing density, ability to retract and reposition the implant during the implantation procedure, ability to perform implantation without ancillary devices such as stents or balloons, reduced risk of reanalyzing or compacting, and improved coverage across the aneurysm neck, for example.

In braided implant delivery systems, it can be advantageous to maintain an attachment between the implant and the delivery system until the implant is in place at the treatment site, then detach the implant so that the delivery system can be extracted. The present disclose describes various example systems, devices, and methods that can be utilized for at least this purpose.

Figs. 1a to 1c illustrate an exemplary delivery system configured for delivery through a microcatheter to a treatment site. Fig. 1a is an exploded view depicting components of the exemplary delivery system. Fig. 1b is a cut-away view depicting the assembled exemplary delivery system including components shown in Fig. 1a. Fig. 1c is a cross-sectional top-down view of the assembled system of Fig. 1b. As shown, the system can include a braided implant 300, a releasing component 110, an affixing component 150, a delivery tube 500, and a pull wire 200.

The braided implant 300 can have a substantially tubular structure having a fold 303 separating an outer fold 302 portion of the implant 300 from an inner fold 304 portion of the implant 300. The implant 300 can be folded such that the inner fold 304 is sized to fit within a lumen 504 of the delivery tube 500, the folded edge 303 rolls over a distal end 506 of the delivery tube 500, and the outer fold 302 fits over the delivery tube 500 extending proximally and attaching to the releasing component 110.

The releasing component 110 can be attached to the outer fold portion 302 of the braided implant 300 and can serve to attach the braided implant 300 to the delivery tube 500 during delivery to a treatment site and during implantation. After implantation is complete, the releasing component 110 can release the delivery tube so that it can be extracted from the patient.

Figs. 1a to 1c show an example releasing component 110 in a compression configuration that can enable the releasing component 110 to attach the braided implant 300 to the delivery tube 500. Configured as shown in Figs. 1a to 1c, the outer fold portion 302 of the braided implant 300 can fold over the releasing component 110 and attach to a band 112 of the releasing component 110. The band 112 can have a tubular structure including an outer surface 118 and a lumen 116, however other shapes are contemplated. The releasing component 110 can include one or more spring members 120 extending from the band and pressing against an outer surface 508 of the

delivery tube 500, providing a friction fit between the releasing component 110 and the delivery tube 500. The spring members 120 can extend distally from a distal surface 114 the band and have distal ends 122 that press up against the delivery tube 500.

An affixing component 150 can be used to attach the releasing component 110 to the braided implant 300. The affixing component 150 can have an outer surface 158 and a lumen 156. The affixing component 150 can be placed over the band 112 of the releasing component 110, securing a portion of the outer fold 302 of the braided implant 300 between the affixing component 150 and the releasing component 110.

The delivery tube 500 can have a lumen 504 therethrough. The lumen 504 can contain the inner fold 304 of the braided implant 300. The lumen can also contain additional elements to facilitate the implantation of the braided implant 300 (not shown).

The delivery tube 500 can have a channel 502 travelling longitudinally on the outer surface 508, and the pull wire 200 can be positioned within the channel 502. The pull wire 200 can have an extending portion 202, such as a hook, that can engage the releasing component 110, and an elongated portion 204 that can be positioned within the channel 502, extending proximally. As shown, the extending portion 202 can extend across the distal surface 114 of the band 112. Engagement of the extending portion 202 with the releasing component can prevent distal movement of the releasing component 110 in relation to the delivery tube 500 and can thereby maintain the attachment between the braided implant 300 and the releasing component 110 until implantation of the braided implant 300 is completed.

The elongated portion 204 of the pull wire 200 can extend proximally beyond the proximal end 505 of the delivery tube 500, providing an operator of the system access to the pull wire 200. As shown in Fig. 1b, the pull wire 200 can be detachably attached to the delivery tube 500 with an

adhesive 250. The adhesive 250 can inhibit movement of the pull wire 200 until sufficient force is applied to the pull wire 200 to break the adhesive 250.

Fig. 1c illustrates a cross-section view of the system near the distal end 506 of the delivery tube, proximal the fold 303 looking proximally as indicated in Fig. 1b. The inner fold 304 of the braided implant 300 can be positioned inside of the lumen 504 of the delivery tube 500; the releasing component 110 can be positioned over the outer surface 508 of the delivery tube 500; spring members 120 can extend from a distal surface 114 of the band 112 of the releasing component 110; the outer fold portion 302 can fit over the releasing component 110 attaching to the band 112 of the releasing component; and an affixing component 150 can fit over the band 112 of the releasing component and a portion of the outer fold 302 of the braided implant 300, affixing the braided implant 300 to the releasing component 110.

Figs. 2a to 2g illustrate a method for deploying a braided implant 300 with a system or device according to the present invention. Fig. 2a illustrates a braided implant delivery system or device that can be provided. The system can include a braided implant 300, a delivery tube 500, a releasing component 110, and a pull wire 200. The system can be assembled as described in relation to Figs. 1a to 1c such that the pull wire 200 is engaged with the releasing component 110 and the releasing component 110 is engaged to the delivery tube 500. The assembled system can be delivered to an aneurysm treatment site via a delivery catheter 600 such as a microcatheter.

Once delivered, the braided implant 300 can be deployed, for example as described in U.S. Patent Application Number 15/903,860. Fig. 2b illustrates the braided implant 300 having an ejected portion 306 ejected from the distal end 602 of the delivery catheter 600. As shown, the braided implant 300 can remain attached to the delivery system such that at least a portion of the outer fold 302 remains inside the catheter 600. The braided implant 300 can remain attached to

the delivery tube 500 so long as the releasing component 110 remains attached to the delivery tube 500. Before implantation of the braided implant is completed, the ejected portion 306 of the braided implant 300 can be retracted and repositioned.

Fig. 2c illustrates steps that can be taken after implantation is complete to release the releasing component 110 from the delivery tube 500, thereby releasing the braided implant 300 from the delivery tube 500. Fig. 2c shows the pull wire 200 disengaged from releasing component 110 and the releasing component 110 beginning to move to a releasing configuration.

The extending portion 202 of the pull wire 200 can be flexible, and the extending portion 202 can disengage the releasing component 110 when the elongated portion 204 of the pull wire 200 is pulled proximally. Once disengaged, the pull wire 200 can be moved as to not inhibit distal movement of the releasing component 110 (in relation to the delivery tube).

The distal ends 122 of the spring members 120 can extend away from the delivery tube 500, moving from a compression configuration to an extended configuration. When in the spring members 120 are in the compression configuration, the spring members 120 can prevent movement of the releasing component 110 in relation to the delivery tube 500. The spring members 120 can be made of Nitinol or other memory shape material such that upon contacting a bodily fluid, such as blood, the spring members 120 can move to a predetermined shape that extends away from the delivery tube 500. Fig. 2c shows the delivery tube 500 moved distally in relation to the catheter, so that the delivery system begins to exit the catheter 600, thereby exposing the distal ends 122 of the spring members 120.

Fig. 2d illustrates the spring members 120 continuing to move into a releasing configuration as they exit the catheter 600. The spring members 120 can press against the braided

implant 300, extending portions of the implant 300, for example to occlude a treatment site opening such as the neck of an aneurysm.

Fig. 2e illustrates the releasing component 110 sliding off the distal end 506 of the delivery tube 500. Fig. 2f is a cross-sectional view looking proximally as indicated in Fig. 2e. The band 112 of the releasing component 110 is shown encompassing the distal end 506 of the delivery tube 500 as the spring members 120 extend outward.

Fig. 2g illustrates the releasing component 110 separated from the delivery tube 500. Once disengaged, the delivery tube 500 can be extracted while the braided implant 300 and releasing component 110 remain implanted.

Figs. 3a and 3b are a cut-away views illustrating a braided implant 300 at various stages of implantation in an aneurysm 10. Fig. 3a illustrates a braided implant 300 partially deployed into an aneurysm 10 of a blood vessel 20 but not yet released from its delivery system. The catheter 600 has been delivered to the site of the aneurysm 10. As shown, the braided implant 300 can form an occlusive sack 308 sized to extend to the walls 14 of the aneurysm 10. The portion of the braided implant 300 not forming an occlusive sack 308 can retain a tubular shape that can be packed into the aneurysm sac 12 forming an embolic filler braid 310. Fig. 3a illustrates the embolic filler braid 310 partially deployed such that a portion of the braid remains in the delivery system. In a partially deployed state, the braid 310 can be retracted back into the delivery tube 500, repositioned and redeployed. During retraction, repositioning, and redeployment, the releasing component 110 can remain attached or engaged with the delivery tube 500, thereby maintaining the attachment between the braided implant 300 and the delivery system.

Fig. 3b illustrates the implant 300 as deployed. The releasing component 110 can remain attached to the braided implant 300 and can reside at the neck of the aneurysm 10 once implanted.

The releasing component 110 can have spring members 120 or other structures that extend outward, expanding the occlusive sack 308 at the neck of the aneurysm 10.

Figs. 4a to 4c illustrate another example of a releasing component 110. As shown, the releasing component 110 can have occluding members 130. Fig. 4a illustrates the releasing component 110 in a configuration sized to fit over a delivery tube 500 and travel through a microcatheter 600. Fig. 4b is a side view of the releasing component 110 depicted in Fig. 4a in an example deployed configuration. Fig. 4c is a top view of the releasing component 110 in the deployed configuration. In the deployed configuration, the occluding members 130 can bend inwardly, at least partially occluding the lumen 116 of the releasing component 110. As discussed in relation to the spring members 120, the occluding members 130 can be composed of a flexible material and/or can be composed of a memory metal such as Nitinol. The occluding members 130 can be deformed in the delivery configuration and move to a pre-determined shape in the deployed configuration. The movement from the deformed to the pre-determined shape can be precipitated by a temperature change when the occluding members 130 contact blood or other bodily fluid.

The releasing component 110 can be oriented such that the occlusion of the lumen 116 of the releasing component 110 by the occluding members 130 would not result in the occluding members 130 inhibiting the releasing component 110 from disengaging and separating from the delivery tube 500. As shown, the occluding members 130 can be attached to the proximal side of the band 112 and the spring members 120 can be attached to the distal side. Oriented thusly, upon exiting the microcatheter 600, the spring members 120 can contact blood or bodily fluid, and as a result disengage the delivery tube 500. Meanwhile the catheter 600 can provide a barrier between the occluding members 130 and blood or fluid. The delivery tube 500 can then be extracted before the occluding members 130 contact blood or bodily fluid. Once the delivery tube 500 is extracted,

the delivery catheter 600 can be extracted, thereby exposing the occluding members 130 to blood or fluid, causing the occluding members 130 to retract to occlude the lumen 116 of the band 112.

Fig. 5a shows the exterior of a device in front of a cut-away of the catheter 600. A pull wire 200 is positioned within a channel 502 on an outer surface 508 of a delivery tube 500. The pull wire 200 extends under the releasing component 110 to engage the releasing component 110. A braided implant 300 is attached to the releasing component 110 with an affixing component 150 and folded with an outer fold portion 302 positioned over the delivery tube 500 and a fold 303 positioned over a distal end of the delivery tube 500.

Fig. 5b shows a cross-sectional view of the system as indicated in Fig. 5a. Fig. 5b shows a potential positioning of the delivery tube 500, delivery tube channel 502, pull wire 200, band 112 of the releasing component 110, outer fold portion 302 of the braided implant 300, affixing component 150, and catheter 600.

Fig. 6 is a cross-sectional view of the device and catheter 600 in the configuration shown in Figs. 5a and 5b. In the cross-section views, the interior or lumen 504 of the delivery tube 500, the proximal end 312 of the braided implant 300, and cross-sections of the pull wire 200, delivery tube channel 502, releasing component 110, affixing component 150, braided implant inner fold 304, delivery tube 500, and braided implant outer fold 302 are visible. The extending portion 202 of the pull wire 200 is shown engaging the band 112 of the releasing component 110, and a spring member 120 is shown extending distally from the band 112 of the releasing component 110. The pull wire 200 can additionally extend to engage the braided implant 300.

Figs. 7a to 7c are cut-away views of an exemplary device at various stages following implantation of the braided implant 300, illustrating a releasing of the braided implant 300 from a delivery system. Figs. 7a to 7c show cross sections of a delivery tube 500, delivery tube channel

502, pull wire 200, releasing component 110, affixing component 150, braided implant proximal end 312, and occlusive sack 308. At the stage illustrated in Fig. 7a, the braided implant 300 has been ejected from the delivery tube 500, and the braided implant 300 begins to detach from the delivery system. The distal end 506 of the delivery tube 500 extends distally out of a delivery catheter 600, and spring members 120 extend away from the delivery tube. The pull wire 200 can engage the releasing component 110 with an extending portion 202, inhibiting distal movement of the releasing component 110.

At the stage illustrated in Fig. 7b, the pull wire 200 has disengaged the releasing component 110. The extending portion 202 can be made of a flexible material that can straighten in response to a force, such that pulling the elongated portion 204 of the pull wire 200 proximally causes the extending portion 202 to retract from the distal surface 114 of the band 112 of the releasing component 110 and straighten to fit within the channel 502 of the delivery tube under the band 112 of the releasing component 110. Once the pull wire 200 is disengaged from the releasing component 110 as shown in Fig. 7b and the spring members 120 extend away from the delivery tube 500, the releasing component 110 can be free to slide off the distal end 506 of the delivery tube 500.

At the stage illustrated in Fig. 7c, the braided implant 300 has detached from the delivery tube 500. As shown, the spring members 120 can extend outwardly to juxtapose the braided implant 300. Once separated, the catheter 600, pull wire 200, and delivery tube 500 can be extracted from a patient.

Figs. 8 and 9 are flow diagrams outlining example method steps for use of a device according to the present invention. The method steps can be implemented by any of the example means described herein or by any means that would be known to one of ordinary skill in the art.

Referring to a method 700 outlined in Fig. 8, in step 710 a braided implantation delivery system having a braided implant, a delivery tube, a releasing component, and a pull wire 200 can be provided. The braided implant delivery system can be any of the delivery systems described herein having any combination of the features described herein, as well as any features that would be known to one skilled in the art. In step 720, the pull wire can be engaged to the releasing component. In step 730, the releasing component can be engaged to the delivery tube. In step 740, the braided implant can be implanted in an aneurysm at a treatment site. In step 750, the pull wire can be pulled to disengage the pull wire from the releasing component. In step 760, the releasing component can disengage from the delivery tube. In step 770, the releasing component can release from the delivery tube, thereby releasing the braided implant from the delivery tube.

Referring to a method 800 outlined in Fig. 9, in step 810 a braided implant delivery system having a braided implant, a delivery tube, a releasing component, and a pull wire can be provided. The braided implant delivery system can be any of the delivery systems described herein having any combination of the features described herein, as well as any features that would be known to one skilled in the art. In step 815, the pull wire can be fastened to the delivery tube with an adhesive. In step 820, the pull wire can engage the releasing component. In step 830, the releasing component can engage the delivery tube. In step 840 the braided implant can be implanted in an aneurysm at a treatment site, forming an occlusive sack by inverting a portion of the braided implant. In step 850, the adhesive can break, and the pull wire can disengage from the releasing component by pulling the pull wire. In step 860, the releasing component can disengage from the delivery tube by moving a spring member from an engaged configuration that engages an outer surface of the delivery tube to a released configuration that extends away from the outer surface

of the delivery tube. In step 870, the releasing component can release from the delivery tube, thereby releasing the braided implant from the delivery tube.

The descriptions contained herein are examples illustrating the invention and are not intended to limit the scope of the invention. As described herein, the invention contemplates many variations and modifications of a system, device, or method that can be used to release a braided implant 300 in an aneurysm. Variations can include but are not limited to alternative geometries of elements and components described herein, utilizing any of numerous materials for each component or element (e.g. radiopaque materials, memory shape metals, etc.), utilizing additional components including components to position the braided implant 300 at a treatment site or eject a portion of the braided implant 300 from the interior of the delivery tube 500, utilizing additional components to perform functions described herein, or utilizing additional components to perform functions not described herein, for example. These modifications would be apparent to those having ordinary skill in the art to which this invention relates and are intended to be within the scope of the claims which follow.

Claims:

1. A system for releasing an implant in an aneurysm, the system comprising:
 - a braided implant;
 - a delivery tube comprising a lumen therethrough, a distal end, an outer surface, and a channel disposed on the outer surface;
 - a releasing component comprising:
 - a band comprising an outer surface attached to a first portion of the braided implant and a lumen encompassing the delivery tube approximate the distal end of the delivery tube, and
 - a spring member attached to the band, the spring member movable from a compression configuration to an extended configuration, the compression configuration pressing the outer surface of the delivery tube, and the extended configuration extending away from the outer surface of the delivery tube; and
 - a pull wire positioned within the channel of the delivery tube, the pull wire movable from an engaging configuration to a releasing configuration, the engaging configuration engaging the releasing component, and the releasing configuration allowing the spring member to expand to its extended configuration.
2. The system of claim 1,
 - wherein the first portion of the braided implant is separated from a second portion of the braided implant by a fold,
 - wherein the first portion encompasses a portion of the outer surface of the distal end of the delivery tube, and

wherein the second portion comprises an elongated tubular structure and is positioned within the lumen of the delivery tube.

3. The system of claim 1 wherein the pull wire comprises an extending portion and an elongated portion, wherein a movement of the elongated portion moves the extending portion from the engaging configuration to the releasing configuration.

4. The system of claim 3 wherein the pull wire is fastened to the channel of the delivery tube with an adhesive, and wherein the movement of the elongated portion breaks the adhesive to unfasten the pull wire.

5. The system of claim 1 further comprising an affixing component affixing the braided implant to the outer surface of the band, the affixing component comprising a lumen therethrough, the lumen encompassing the band.

6. The system of claim 1 wherein the spring member is an elongated member comprising a proximal end and a distal end, the proximal end attached to a distal surface of the band, the distal end pressing the outer surface of the delivery tube in the compression configuration, and the distal end extending away from the outer surface of the delivery tube in the extended configuration.

7. The system of claim 1 wherein the releasing component further comprises an occlusion member attached to the band movable from a delivery configuration to a deployed configuration,

the delivery configuration extending longitudinally along the outer surface of the delivery tube, and the deployed configuration at least partially obstructing the lumen of the band.

8. The system of claim 1 wherein the releasing component comprises a radiopaque material.
9. A device for treating an aneurysm, the device comprising:
 - a tubular delivery member comprising a distal delivery end, an interior, and an exterior;
 - a braided tubular implant comprising:
 - a distal implant end extending outward from the distal delivery end of the tubular delivery member and folding proximally over a portion of the exterior of the tubular delivery member, and
 - a proximal implant end positioned within the interior of the tubular delivery member;
 - a releasing component attached to the distal implant end and detachably attached to the exterior of the tubular delivery member approximate the distal delivery end; and
 - a bending member positioned approximate the distal delivery end of the tubular delivery member, the bending member comprising a bent configuration and a straight configuration, the bent configuration engaging a distal surface of the releasing component, and the straight configuration being disengaged from the distal surface of the releasing component.
10. The device of claim 9 wherein the releasing component comprises an attached configuration and a deployed configuration, the attached configuration engaging the exterior of

the tubular delivery member and the deployed configuration disengaging the exterior of the tubular delivery member.

11. The device of claim 10 wherein the deployed configuration at least partially occludes the lumen of the band.

12. The device of claim 9 wherein the bending member is the extending portion of a pull wire, and wherein a movement of an elongated portion of the pull wire moves the extending portion from the bent configuration to the straight configuration.

13. The device of claim 12 wherein the pull wire is positioned within a channel on the exterior of the tubular delivery member.

14. The device of claim 12 wherein the pull wire is fastened to the tubular delivery member with an adhesive, and wherein the movement of the elongated portion breaks the adhesive to unfasten the pull wire.

15. A method for releasing an implant at an aneurysm treatment site, the method comprising:
providing a braided implantation delivery system, wherein the implantation delivery system comprises a braided implant, a delivery tube, a releasing component, and a pull wire;
engaging the pull wire to the releasing component;
engaging the releasing component to the delivery tube;

implanting the braided implant at the treatment site;
pulling the pull wire to disengage from the releasing component;
disengaging the releasing component from the delivery tube; and
releasing the releasing component from the delivery tube which releases the braided implant from the delivery tube.

16. The method of claim 15 wherein the step of releasing the releasing component further comprises the step of moving a spring member of the releasing component from an engaged configuration engaging an outer surface of the delivery tube to a released configuration extending away from the outer surface of the delivery tube.

17. The method of claim 15 wherein the step of implanting of the braided implant further comprises forming an occlusive sack by inverting a portion of the braided implant.

18. The method of claim 15 further comprising the step of fastening the pull wire to the delivery tube with an adhesive; and wherein the step of pulling the pull wire further comprises the step of breaking the adhesive.

19. The method of claim 15 wherein the releasing component comprises a lumen and a movable member, the method further comprising the step of moving the member to at least partially occlude the lumen.

Abstract

A device for treating an aneurysm by releasing an implanted implant from a delivery system at a treatment site can include a braided implant attached to a releasing component that can be detachably engaged with a delivery tube and a pull wire. The releasing component can engage the delivery tube in a compressed configuration via friction fit and can disengage the delivery tube by expanding to a released or deployed configuration. The pull wire can have an extending portion that can engage the releasing component and an elongated portion that can be pulled to disengage the releasing component. The braided implant, once implanted, can be released from the delivery tube by disengaging the pull wire from the releasing component and disengaging the releasing component from the delivery tube.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE
REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number: Herewith
Filing Date: 08/08/2018
First Named Inventor: Lacey GOROCHOW
Title: DELIVERY SYSTEM FOR EMBOLIC BRAID
Art Unit: TBD
Examiner Name: TBD
Attorney Docket Number: 243382.000122

SIGNATURE of Applicant or Patent Practitioner

Signature: /Christopher Franich/ Date (Optional): 08/08/2018
Name: Christpher Franich Registration Number: 69414
Title (if Applicant is a juristic entity):
Applicant Name (if Applicant is a juristic entity):

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.

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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.

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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).

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

DELIVERY SYSTEM FOR EMBOLIC BRAID

As the below named inventor, I hereby declare that:

This declaration
is directed to:

☒

The attached application, or

☐

United States application or PCT international application number _____

filed on _____.

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Lacey GOROCHOW

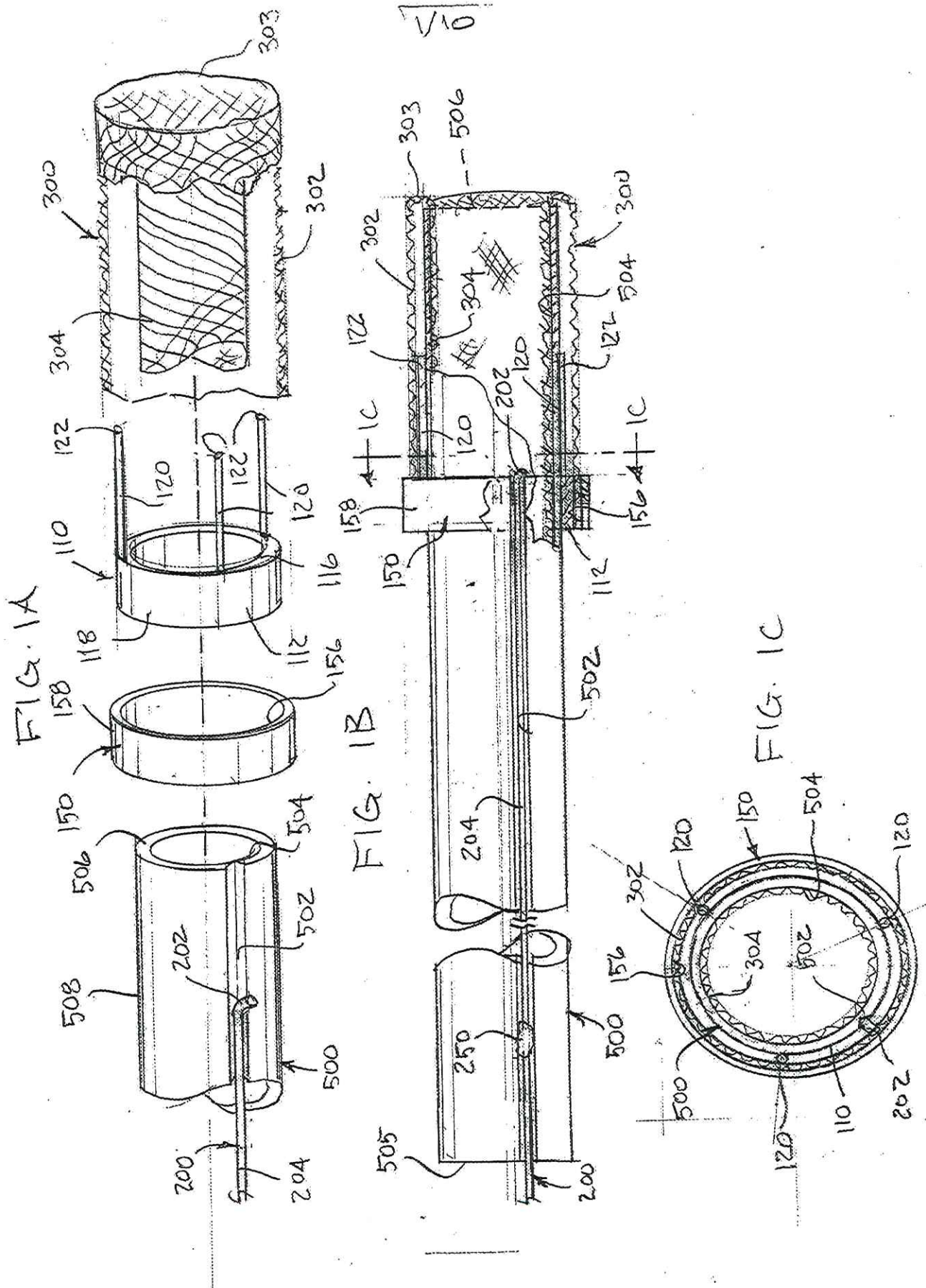
Date (Optional): 8-7-2018

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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FIG. 2A

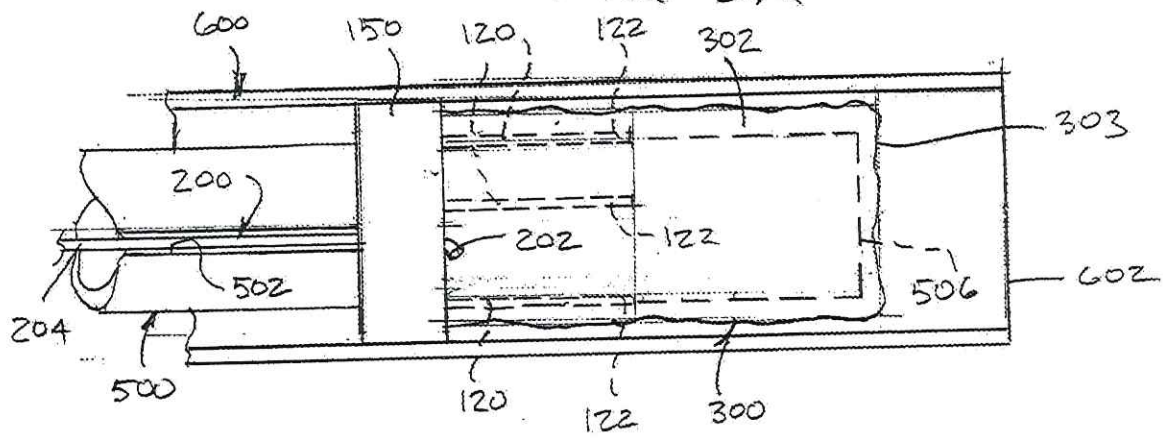


FIG. 2B

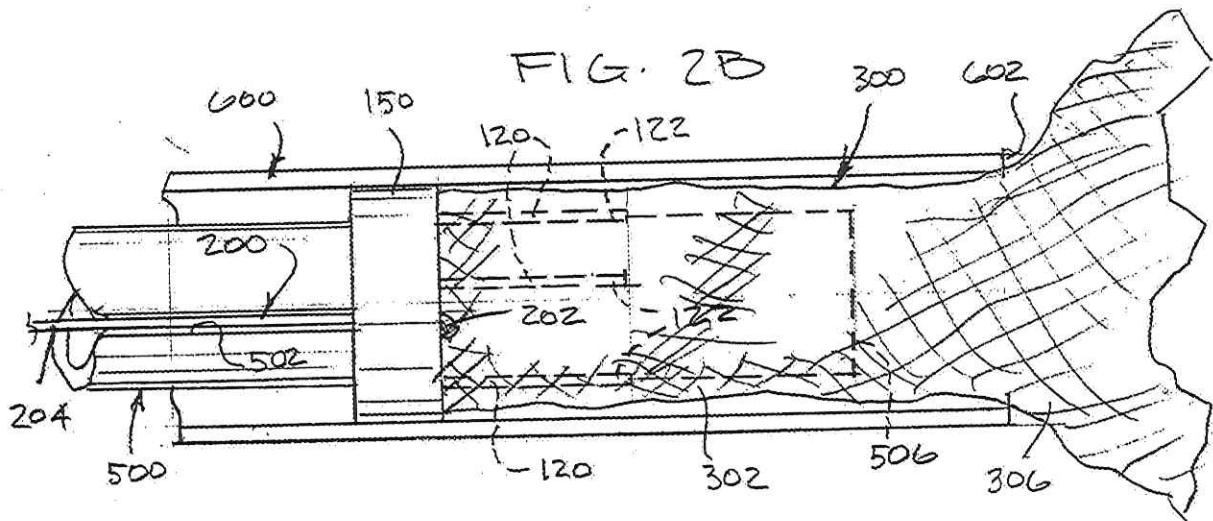


FIG. 2C

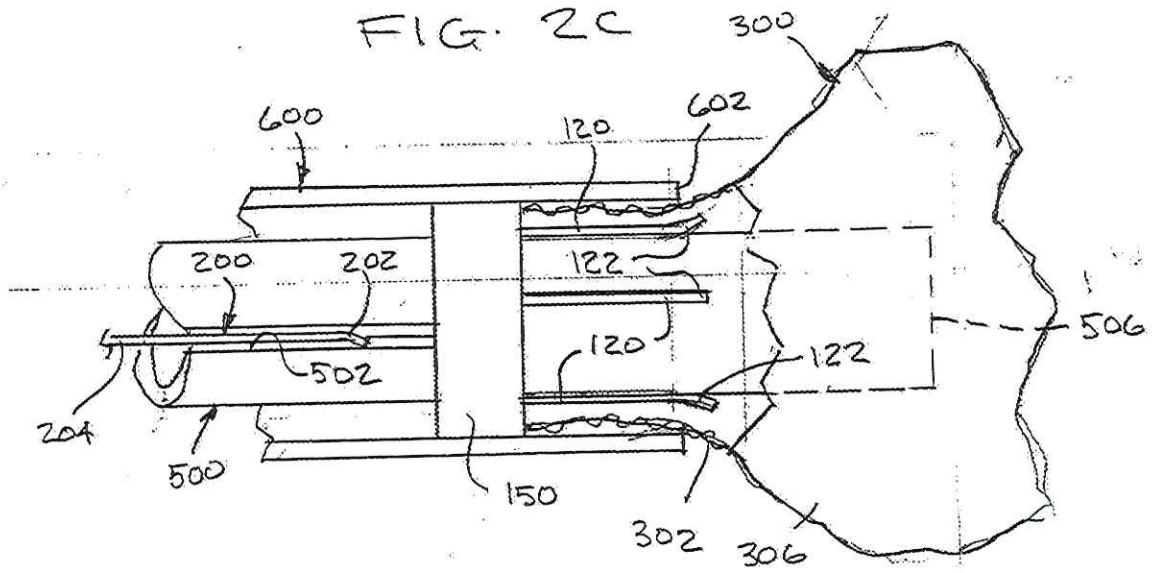


FIG. 2D

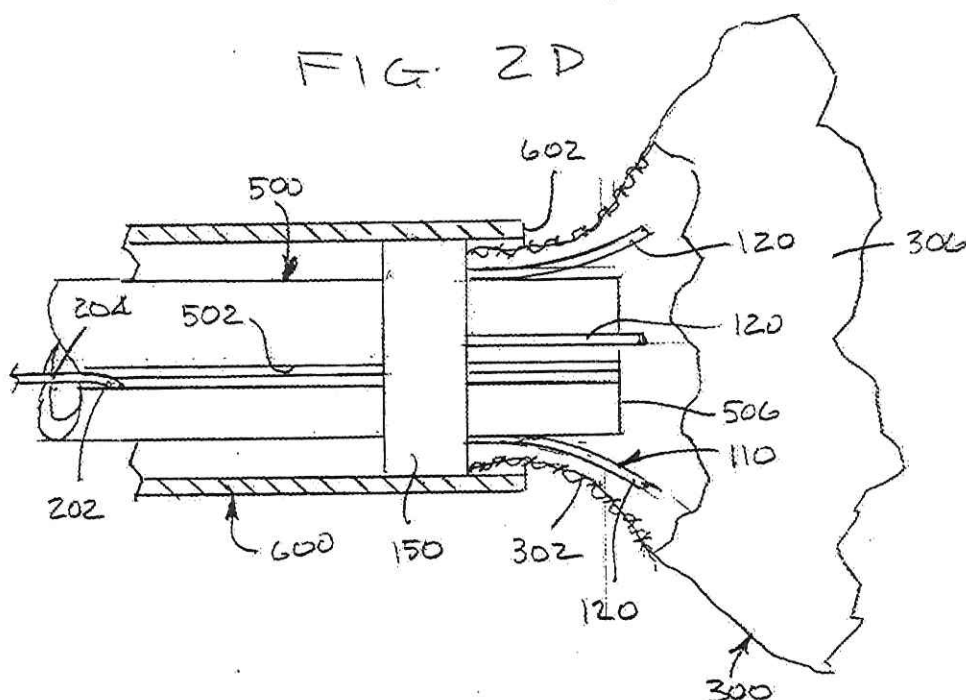


FIG. 2E

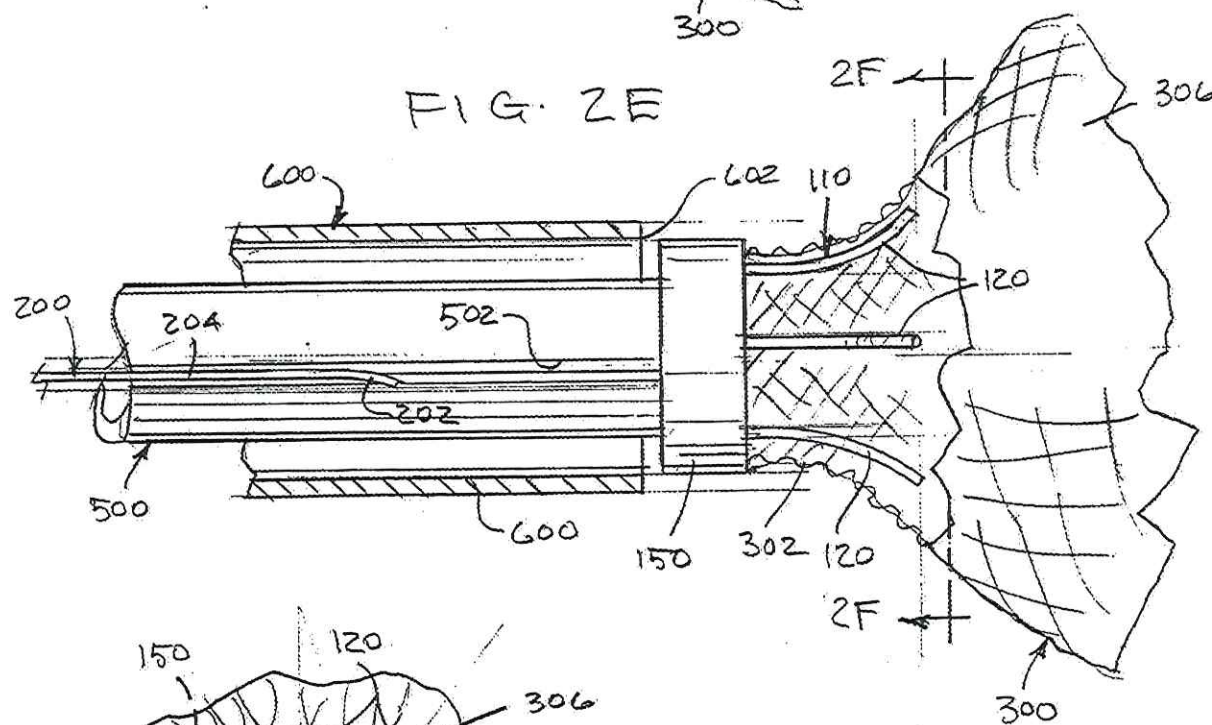


FIG 2F

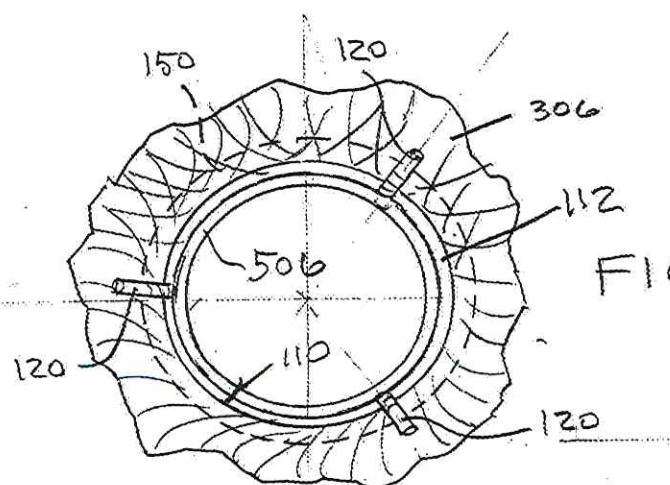


FIG 2G

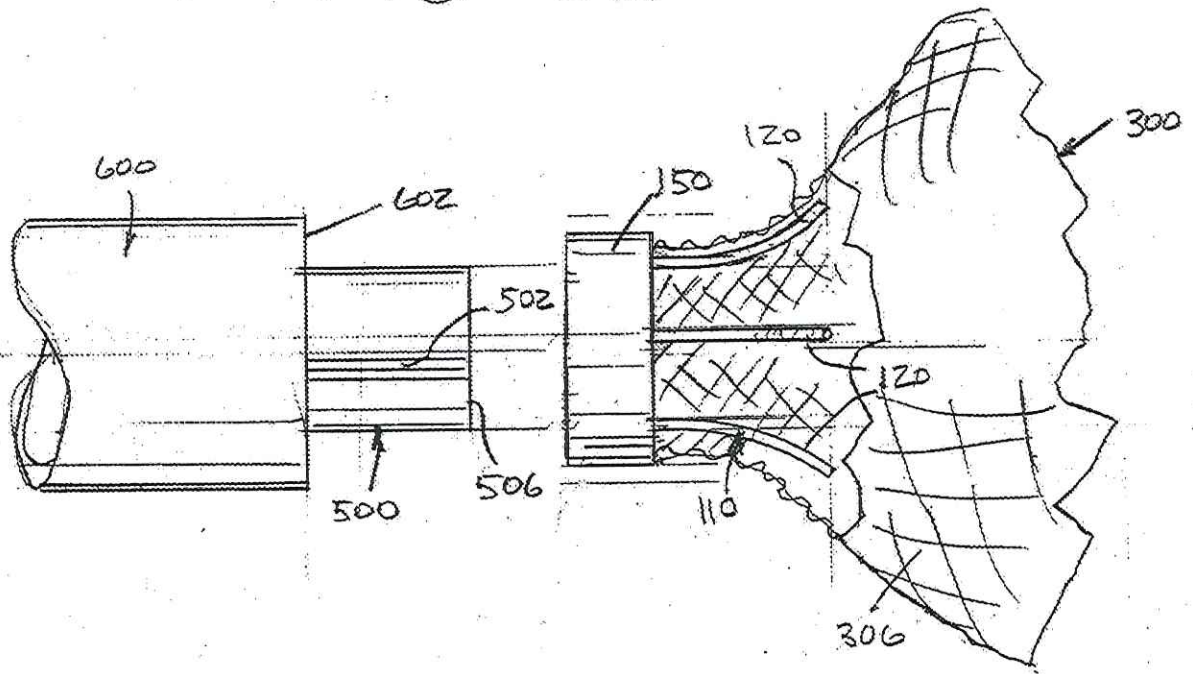
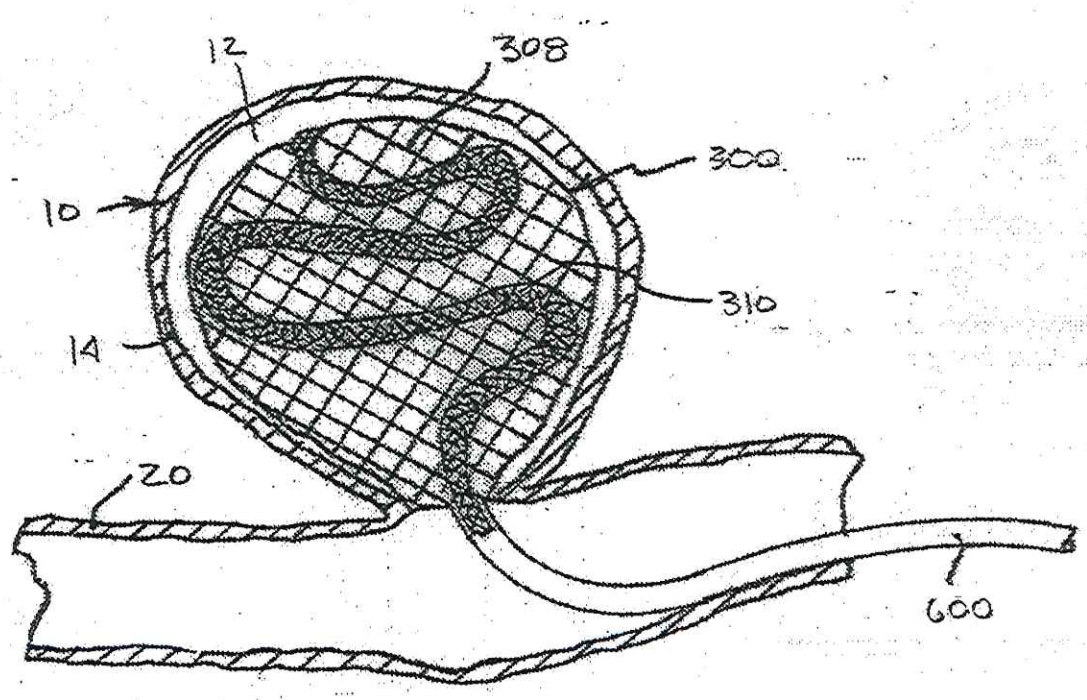


FIG. 3A



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FIG. 3B

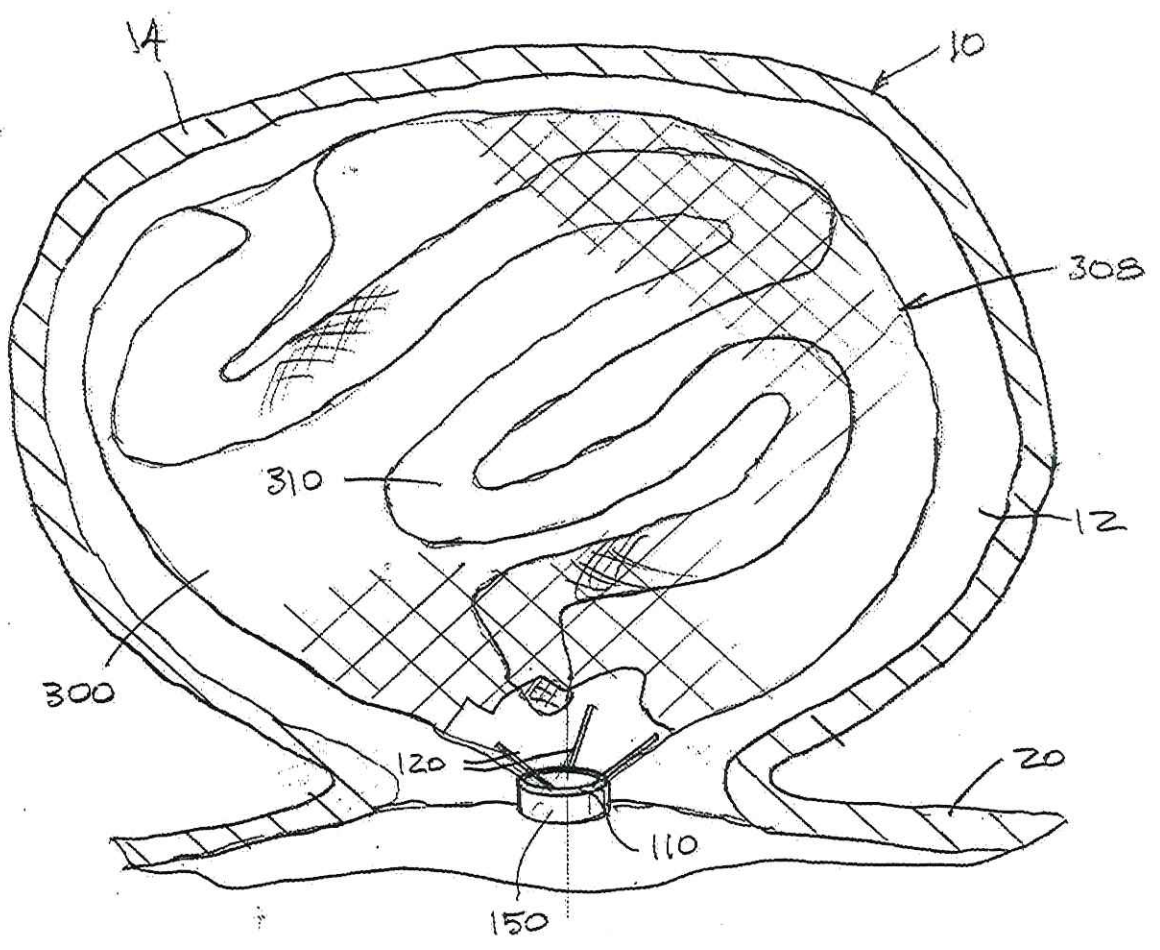


FIG. 4A

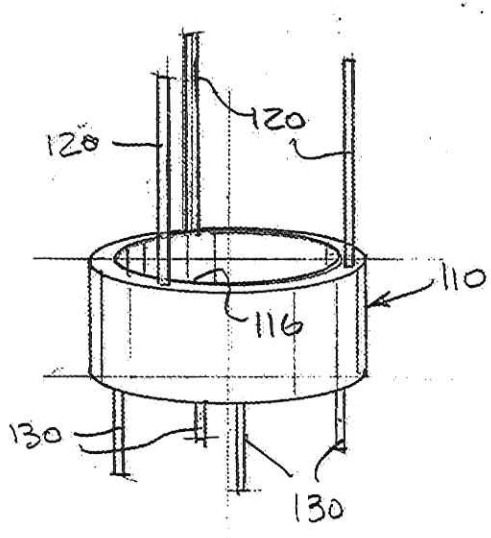
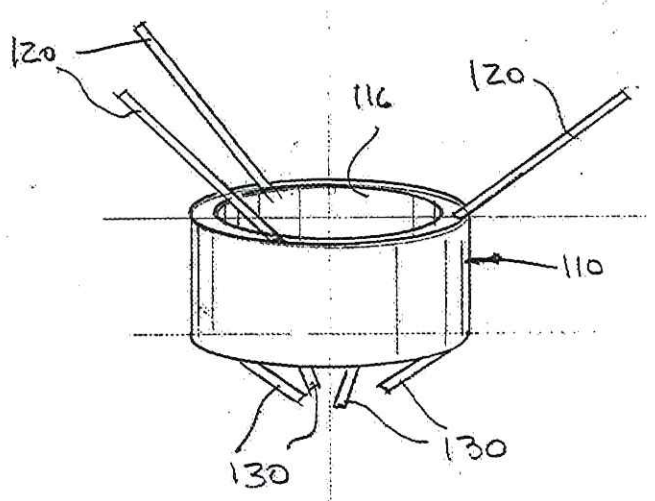
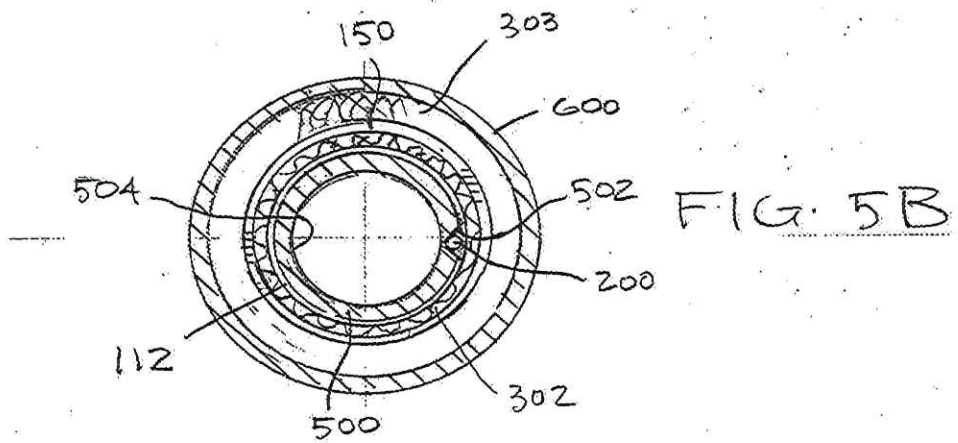
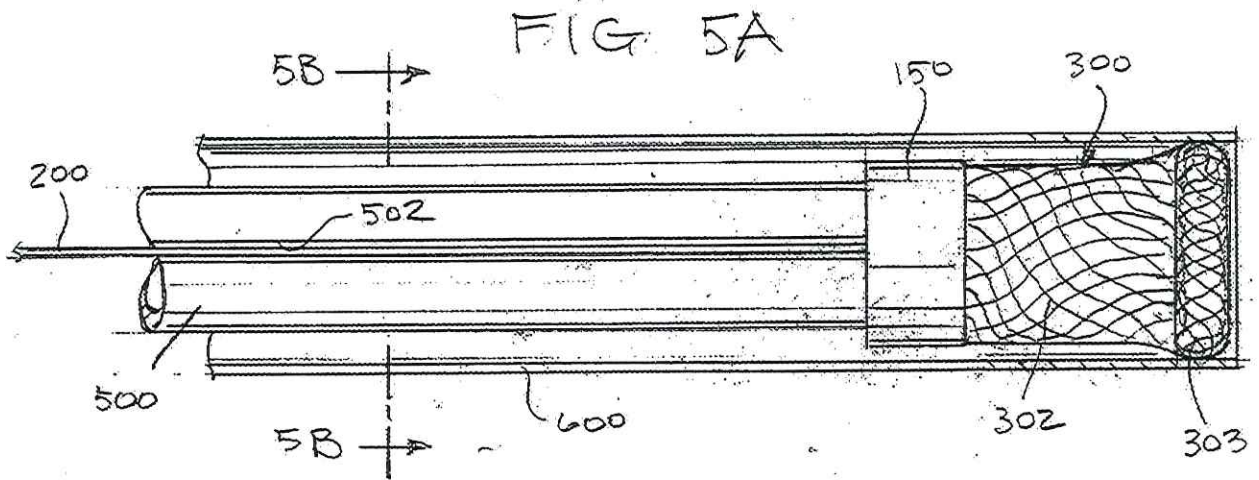
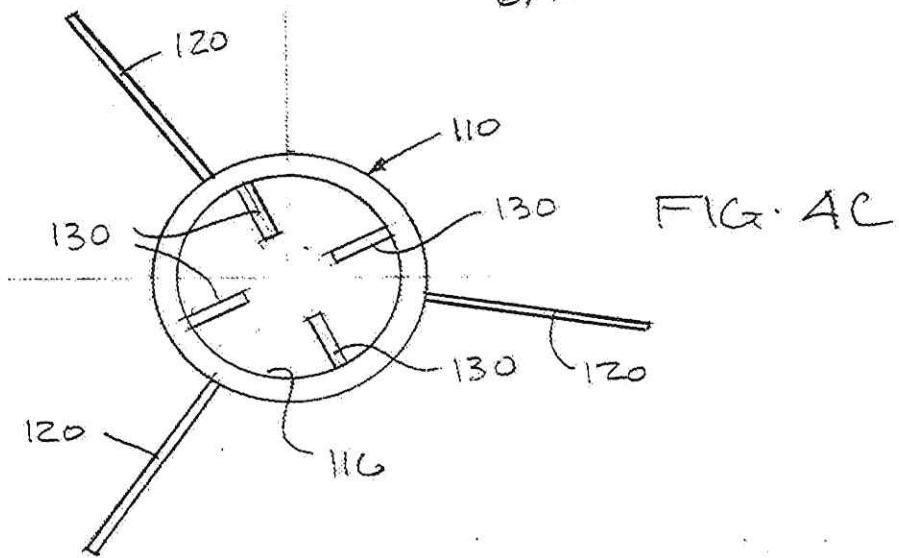


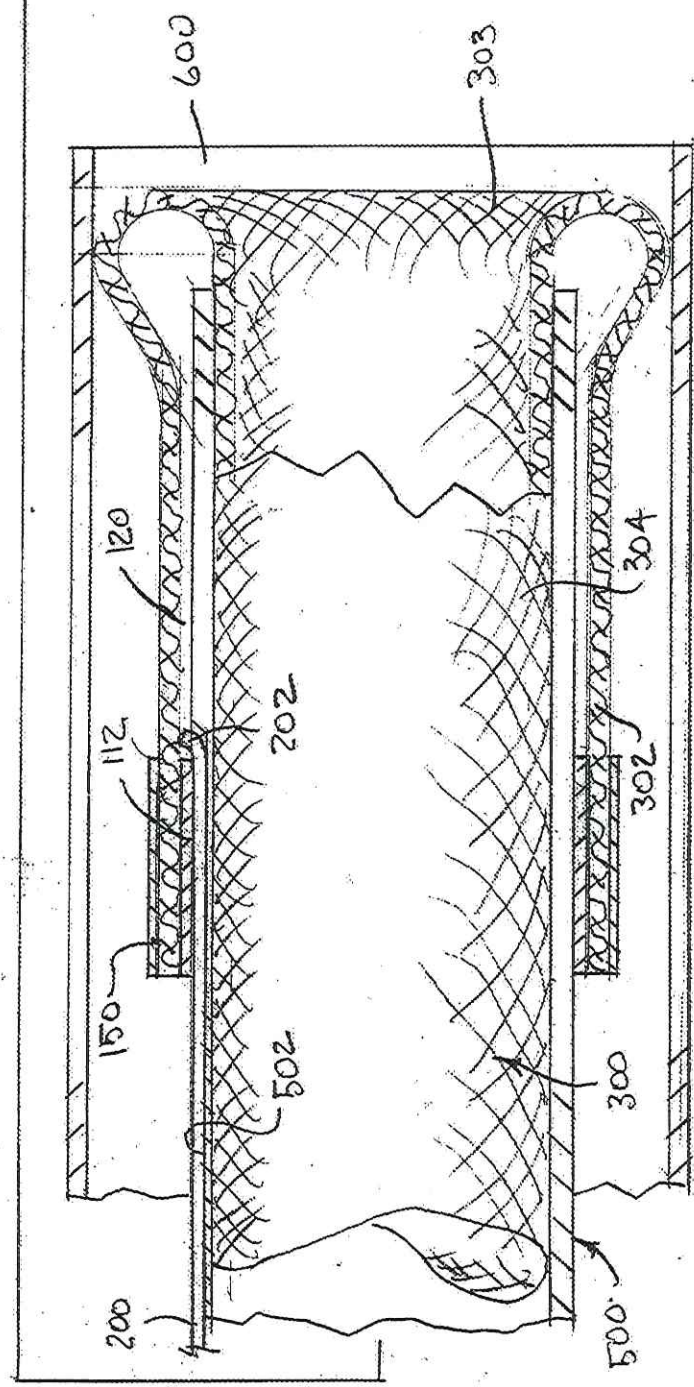
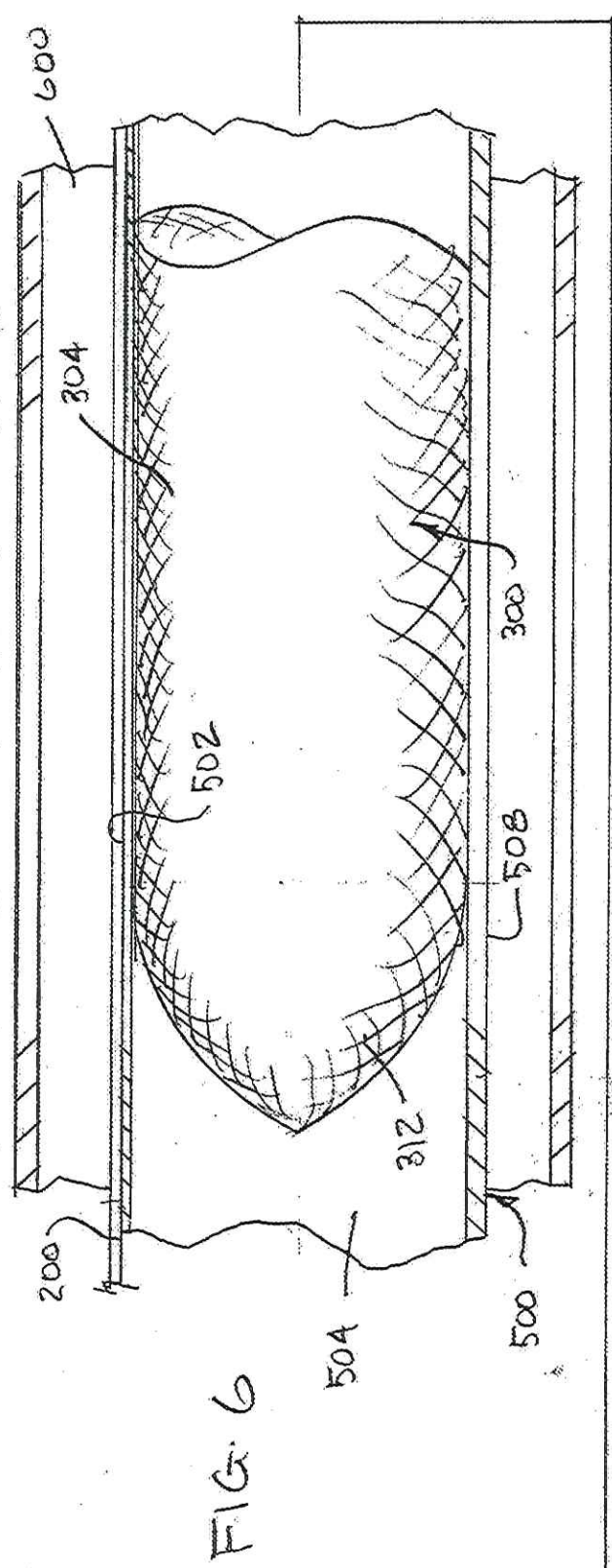
FIG. 4B



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FIG. 7A

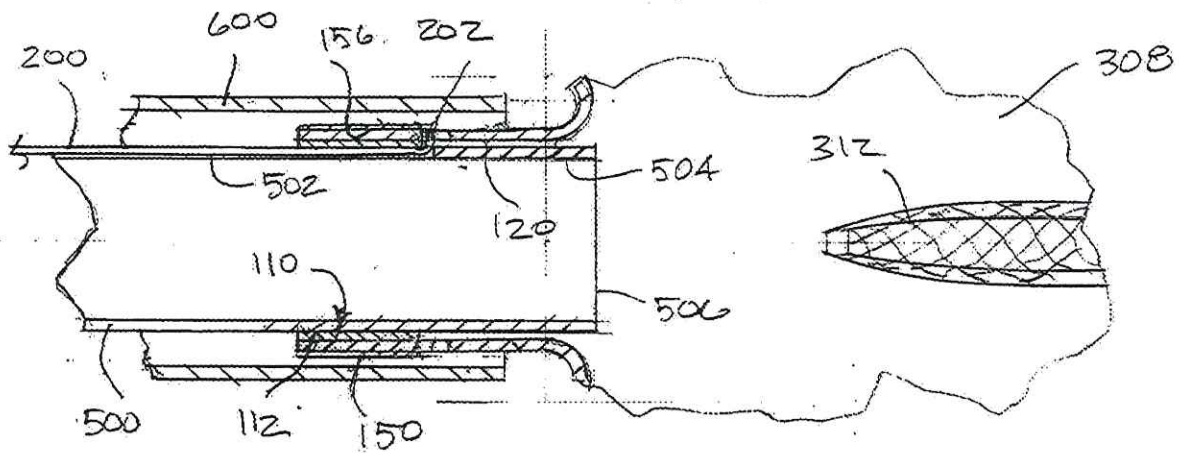


FIG. 7B

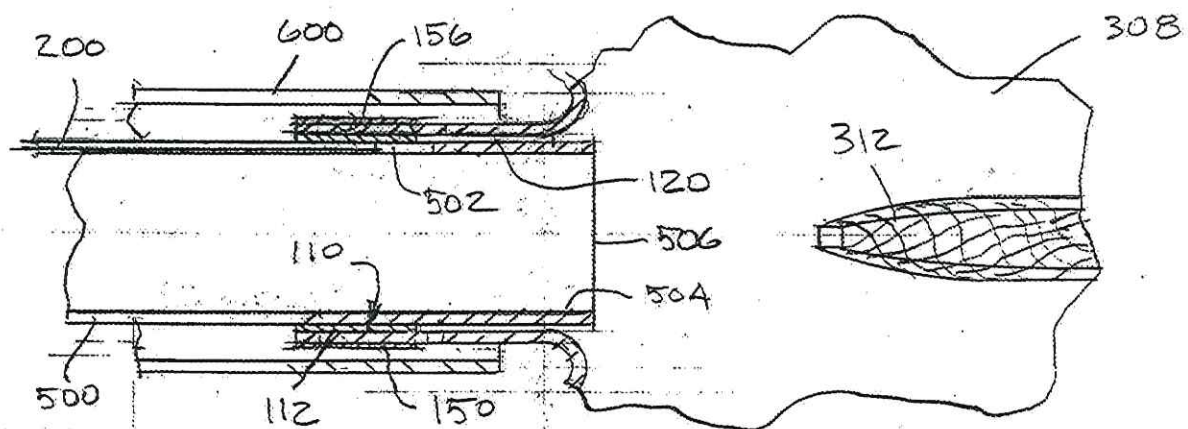
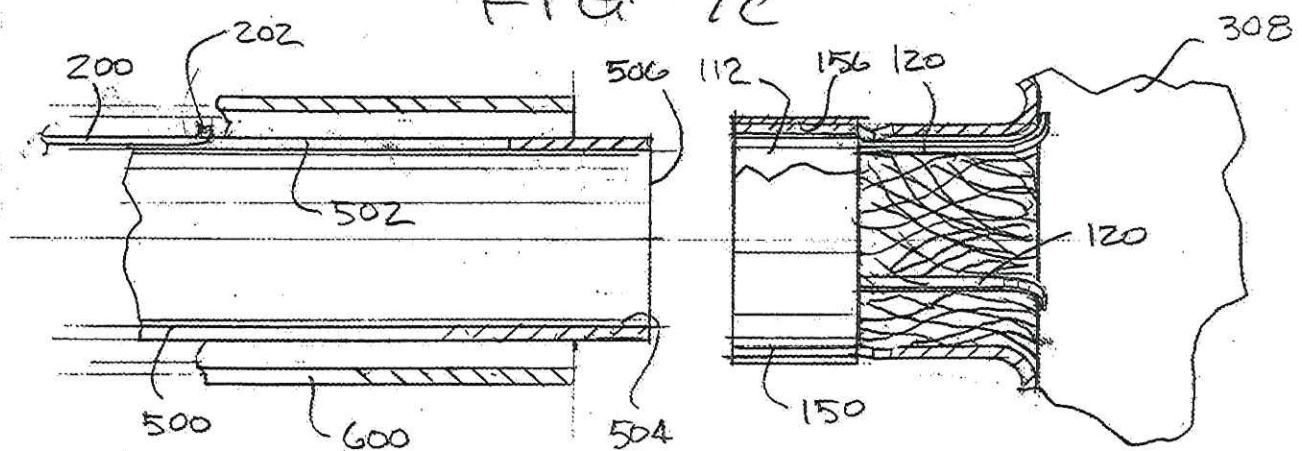


FIG. 7C



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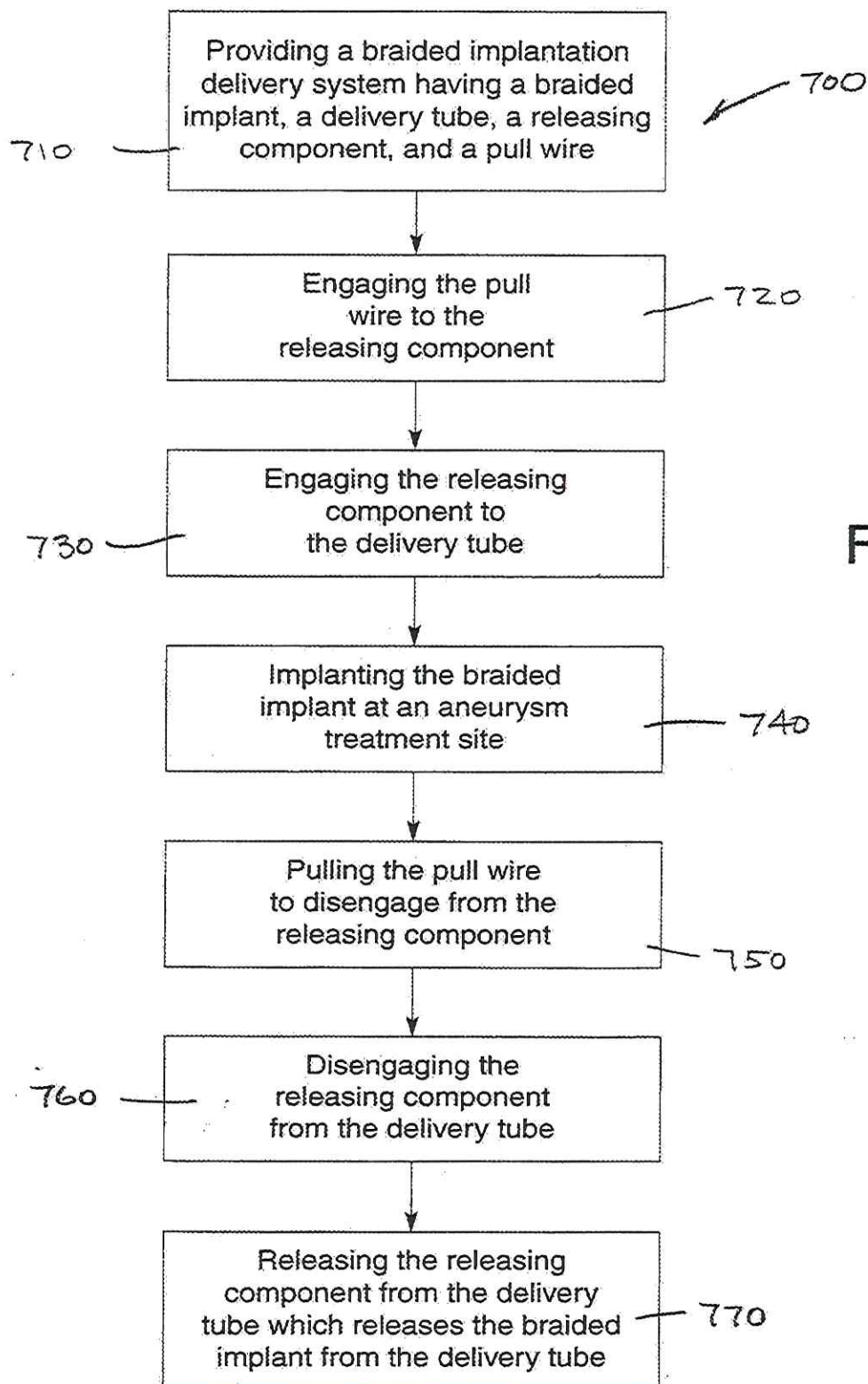
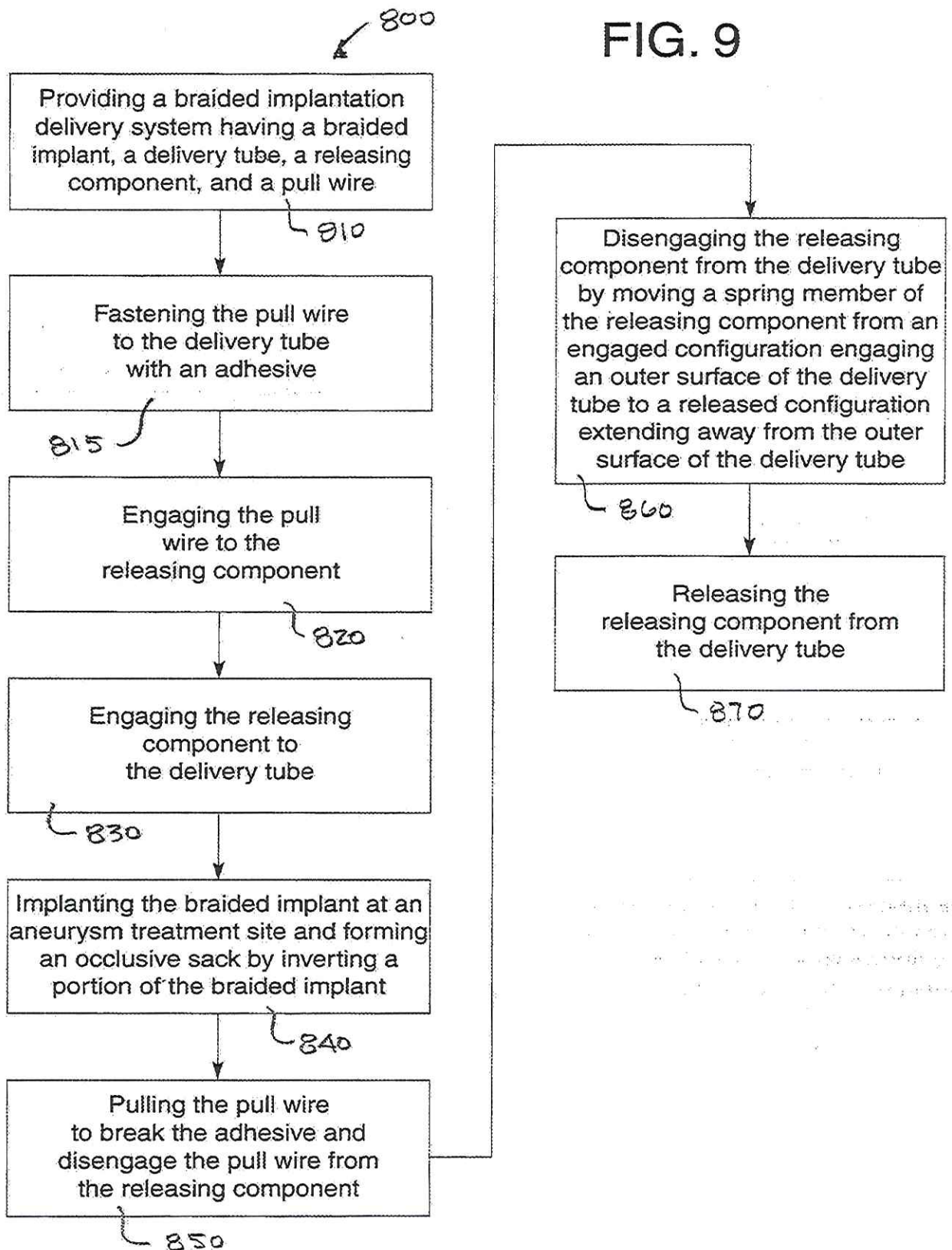


FIG. 8

FIG. 9



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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		
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				<button>Remove</button>	
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						
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All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <button>Add</button> button.						

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Email Address	IPServicesNYC@troutmansanders.com	<button>Add Email</button>	<button>Remove Email</button>

Application Information:

Title of the Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		
Attorney Docket Number	243382-000122	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	10	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		

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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

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Customer Number	06980		

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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	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		

Foreign Priority Information:

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

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

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	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		

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.

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	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	243382-000122
		Application Number	
Title of Invention	DELIVERY SYSTEM FOR EMBOLIC BRAID		

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	/Christopher Franich/		Date (YYYY-MM-DD)	2018-08-08	
First Name	Christopher	Last Name	Franich	Registration Number	69414
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.



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

7 de agosto de 2019

POR ESTE MEDIO, SE CERTIFICA QUE EL DOCUMENTO ADJUNTO ES UNA COPIA FIEL DE LOS REGISTROS DE LA OFICINA DE PATENTES Y MARCAS DE LOS ESTADOS UNIDOS DE DICHOS DOCUMENTOS DE LA SOLICITUD DE PATENTE IDENTIFICADA A CONTINUACIÓN QUE CUMPLIÓ CON LOS REQUISITOS PARA QUE SE LE OTORGARA UNA FECHA DE PRESENTACIÓN EN VIRTUD DE LO DISPUESTO EN 35 USC 111.

NÚMERO DE SOLICITUD: 16/058.918

FECHA DE PRESENTACIÓN: 8 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 US16/058.918

Por autoridad del
Subsecretario de Comercio para la Propiedad Intelectual
y Director de la Oficina de Patentes y Marcas de los Estados Unidos




R GLOVER

Funcionario certificador

Reivindicaciones:

1. Un sistema para liberar un implante en un aneurisma, el sistema comprende:

un implante trenzado;

un tubo de suministro que comprende un lumen a través de este, un extremo
5 distal, una superficie exterior, y un canal dispuesto en la superficie exterior;

un componente liberador que comprende:

una banda que comprende una superficie exterior acoplada a una primera
porción del implante trenzado y un lumen que abarca el tubo de suministro
cerca al extremo distal del tubo de suministro, y

10 un miembro de resorte acoplado a la banda, el miembro de resorte es
móvil desde una configuración de compresión a una configuración
extendida, la configuración de compresión presiona la superficie exterior
del tubo de suministro, y la configuración extendida se extiende lejos de
la superficie exterior del tubo de suministro; y

15 un alambre de tracción ubicado dentro del canal del tubo de suministro, el
alambre de tracción es móvil desde una configuración de acoplamiento a una
configuración de liberación, la configuración de acoplamiento acopla el
componente liberador, y la configuración de liberación permite que el miembro
de resorte se expanda a su configuración extendida.

20

2. El sistema de la reivindicación 1,

en donde la primera porción del implante trenzado se separa de una segunda porción
del implante trenzado por un pliegue,

en donde la primera porción abarca una porción de la superficie exterior del extremo distal del tubo de suministro, y

en donde la segunda porción comprende una estructura tubular alargada y se ubica dentro del lumen del tubo de suministro.

5

3. El sistema de la reivindicación 1 en donde el alambre de tracción comprende una porción extensible y una porción alargada, en donde un movimiento de la porción alargada mueve la porción extensible de la configuración de acoplamiento a la configuración de liberación.

10

4. El sistema de la reivindicación 3 en donde el alambre de tracción está sujeto al canal del tubo de suministro con un adhesivo, y en donde el movimiento de la porción alargada rompe el adhesivo para soltar el alambre de tracción.

15

5. El sistema de la reivindicación 1 que comprende, además, un componente de fijación que fija el implante trenzado en la superficie exterior de la banda, el componente de fijación comprende un lumen a través de este, el lumen abarca la banda.

20

6. El sistema de la reivindicación 1 en donde el miembro de resorte es un miembro alargado que comprende un extremo proximal y un extremo distal, el extremo proximal se acopla a una superficie distal de la banda, el extremo distal presiona la superficie exterior del tubo de suministro en la configuración de compresión, y el extremo distal

se extiende lejos de la superficie exterior del tubo de suministro en la configuración extendida.

7. El sistema de la reivindicación 1 en donde el componente liberador comprende, además, un miembro de oclusión acoplado a la banda que es móvil desde una configuración de suministro a una configuración desplegada, la configuración de suministro se extiende longitudinalmente a lo largo de la superficie exterior del tubo de suministro, y la configuración desplegada al menos obstruye parcialmente el lumen de la banda.
8. El sistema de la reivindicación 1 en donde el componente liberador comprende un material radiopaco.
9. Un dispositivo para tratar un aneurisma, el dispositivo comprende:
 - un miembro de suministro tubular que comprende un extremo de suministro distal, un interior y un exterior;
 - un implante tubular trenzado que comprende:
 - un extremo de implante distal que se extiende hacia afuera desde el extremo de suministro distal del miembro de suministro tubular y que se pliega proximalmente sobre una porción del exterior del miembro de suministro tubular, y
 - un extremo proximal de implante ubicado dentro del interior del miembro de suministro tubular;

un componente liberador acoplado al extremo distal de implante y acoplado de manera desmontable al exterior del miembro de suministro tubular cerca al extremo de suministro distal; y

5 un miembro de flexión ubicado cerca del extremo de suministro distal del miembro de suministro tubular, el miembro de flexión comprende una configuración doblada y una configuración recta, la configuración doblada se acopla a una superficie distal del componente liberador, y la configuración recta se desacopla de la superficie distal del componente liberador.

10 10. El dispositivo de la reivindicación 9 en donde el componente liberador comprende una configuración acoplada y una configuración desplegada, la configuración acoplada acopla el exterior del miembro de suministro tubular y la configuración desplegada desacopla el exterior del miembro de suministro tubular.

15 11. El dispositivo de la reivindicación 10 en donde la configuración desplegada al menos ocluye parcialmente el lumen de la banda.

12. El dispositivo de la reivindicación 9 en donde el miembro de flexión es la porción extensible de un alambre de tracción, y en donde un movimiento de una porción alargada
20 del alambre de tracción mueve la porción extensible desde la configuración doblada a la configuración recta.

13. El dispositivo de la reivindicación 12 en donde el alambre de tracción se ubica dentro de un canal en el exterior del miembro de suministro tubular.

14. El dispositivo de la reivindicación 12 en donde el alambre de tracción se sujeta al miembro de suministro tubular con un adhesivo, y en donde el movimiento de la porción alargada rompe el adhesivo para soltar el alambre de tracción.

15. Un método para liberar un implante en un sitio de tratamiento de aneurisma, el método comprende:

10 proporcionar un sistema de suministro de implante trenzado, en donde el sistema de suministro de implantación comprende un implante trenzado, un tubo de suministro, un componente liberador, y un alambre de tracción;
acoplar el alambre de tracción al componente liberador;
acoplar el componente liberador al tubo de suministro;
15 implantar el implante trenzado en el sitio de tratamiento;
jalar el alambre de tracción para desacoplar el componente liberador;
desacoplar el componente liberador del tubo de suministro; y
liberar el componente liberador del tubo de suministro que libera el implante trenzado del tubo de suministro.

20

16. El método de la reivindicación 15 en donde la etapa de liberar el componente liberador comprende, además, la etapa de mover un miembro de resorte del componente liberador de una configuración acoplada para acoplar una superficie exterior del tubo de

suministro a una configuración liberada que se extiende lejos de la superficie exterior del tubo de suministro.

17. El método de la reivindicación 15 en donde la etapa de implantar el implante trenzado
5 comprende, además, un saco ocluyente al invertir una porción del implante trenzado.

18. El método de la reivindicación 15 que comprende, además, la etapa de sujetar
el alambre de tracción al tubo de suministro con un adhesivo; y en donde etapa de jalar
el alambre de tracción comprende, además, la etapa de romper el adhesivo.

10

19. El método de la reivindicación 15 en donde el componente liberador comprende
un lumen y un miembro móvil, el método comprende, además, la etapa de mover el
miembro para al menos ocluir parcialmente el lumen.

P-2019/36337

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIRECCIÓN DE NUEVAS CREACIONES

E. S. D.

Ref.: Expediente No. **NC2019/0008624**

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. 8743 del 21 de agosto de 2019, de la siguiente manera

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