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SURGICAL DEVICE INCLUDING BUTTRESS MATERIAL

ABSTRACT

The present disclosure provides a surgical stapling device (10) and a method for joining tissue portions. The surgical stapling device (10) includes a handle assembly (12) and a tubular body portion (100) supported on a distal end of the handle assembly (12) having a staple cartridge assembly (102) containing a plurality of surgical staples in an annular array. An anvil assembly (200) is at a distal end of the stapling device (10) and has a shaft (110) for removably connecting the anvil assembly (200) to the tubular body portion (100). The anvil assembly (200) and tubular body portion (100) are juxtaposed with respect to one another along the shaft (110) and are arranged so as to be approximated with respect to one another. A support member (108) extends from the tubular body portion (100) towards the anvil assembly (200) and a buttress material (300) is supported by the support member (108) and removably attached to the support member (108).

SURGICAL DEVICE INCLUDING BUTTRESS MATERIAL

FIELD

[0001] The present disclosure relates to buttress materials for use with a surgical stapling device and, more particularly, to a method and structure for attaching a buttress material to a surgical stapling device for use in anastomosis procedures.

BACKGROUND

[0002] Staples have traditionally been used to replace suturing when joining or anastomosing various body structures such as, for example, the bowel or bronchus. The surgical stapling devices employed to apply these staples are generally designed to simultaneously cut and seal an extended segment of tissue in a patient, thus vastly reducing the time and risks of such procedures.

[0003] Linear or annular surgical stapling devices are employed by surgeons to sequentially or simultaneously apply one or more linear rows of surgical fasteners, e.g., staples or two-part fasteners, to body tissue for the purpose of joining segments of body tissue together and/or for the creation of anastomoses. Linear surgical stapling devices generally include a pair of jaws or finger-like structures between which body tissue to be joined is placed. When the surgical stapling device is actuated and/or “fired”, firing bars move longitudinally and contact staple drive members in one of the jaws, and surgical staples are pushed through the body tissue and into/against an anvil in the opposite jaw thereby crimping the staples closed. A knife blade may be provided to cut between the rows/lines of staples. Examples of such surgical stapling devices are described in U.S. Patent Nos. 4,354,628, 5,014,899 and 5,040,715, the entirety of each of which is incorporated herein by reference.

[0004] Annular surgical stapling devices generally include an annular staple cartridge assembly including a plurality of annular rows of staples, typically two, an anvil assembly operatively associated with the annular cartridge assembly, and an annular blade disposed internal of the rows of staples. Examples of such annular surgical stapling devices are described in U.S. Patent Nos. 5,799,857 and 5,915,616 to Robertson et al., the entirety of each of which is incorporated herein by reference.

[0005] In general, an end-to-end anastomosis stapler typically places an array of staples into the approximated sections of a patient's bowels or other tubular organs. The resulting anastomosis contains an inverted section of bowel which contains numerous "B" shaped staples to maintain a secure connection between the approximated sections of bowel.

[0006] For most procedures, the use of bare staples, with the staples in direct contact with the patient's tissue, is generally acceptable. The integrity of the tissue will normally serve to prevent the staples from tearing out of the tissue and compromising the sealing before healing has occurred. However, in some surgical operations, surgical supports, e.g., meshes or buttress materials, are employed by surgeons in combination with linear stapling devices to bridge, repair and/or reinforce tissue defects within a patient, especially those occurring in the abdominal wall, chest wall, diaphragm, and other musculo-aponeurotic areas of the body. Examples of suitable surgical supports are disclosed in U.S. Patent Nos. 3,054,406, 3,124,136, 4,347,847, 4,655,221, 4,838,884, 5,002,551, and 7,942,890, the entirety of each of which is incorporated herein by reference.

[0007] When the staples are applied in surgical procedures utilizing surgical supports (i.e., reinforcing material), the legs of the staple typically pass from the cartridge jaw through a layer of the surgical support, and through the patient's tissue before encountering the anvil jaw.

[0008] While the surgical supports described above are used in conjunction with linear surgical stapling devices, the need exists for annular support structures for use in conjunction with annular or circular surgical stapling devices, for example, an end-to-end anastomosis stapler such as a Model "EEATM" instrument available from United States Surgical, a Division of Tyco Health-Care Group, LP, Norwalk, CT and disclosed in U.S. Patent No. 5,392,979 to Green et al.

[0009] One possible side effect of any end-to-end bowel anastomosis is its tendency to undergo stenosis, which can decrease the diameter of the lumen over time. Accordingly, the need exists for an annular surgical structure which operates in conjunction with any end-to-end, annular, or circular anastomosis or stapling device and assists in keeping open the lumen of the anastomosed bowel or other tubular organ over time.

[0010] A need also exists for an annular support structure which operates in conjunction with any end-to-end, annular or circular stapling device to reduce the trauma suffered by the patient, reduce the instances of leakage, reduce the instances of bleeding, and create a relatively strong bond between adjacent body tissues.

OBJECT

[0011] It is the object of the present invention to substantially overcome or ameliorate one or more of the disadvantages of the prior art, or at least provide a useful alternative.

SUMMARY

[0012] The present disclosure provides a surgical stapling device having support members for supporting and attaching a buttress material thereto and a method of using the same.

[0012a] An aspect of the present invention provides a surgical stapling device for joining tissue portions, comprising:

- a handle assembly;

- a tubular body portion supported on a distal end of the handle assembly, the tubular body portion having a staple cartridge assembly containing a plurality of surgical staples in an annular array, and an elongate member extending axially therefrom and defining a distal surface, the staple cartridge assembly defining an inner annular edge, wherein a gap is defined between the inner annular edge of the staple cartridge assembly and the elongate member;

- an anvil assembly at a distal end of the surgical stapling device, the anvil assembly having a shaft for removably connecting the anvil assembly to the tubular body portion, the anvil assembly and tubular body portion being juxtaposed with respect to one another along the shaft and arranged so as to be approximated with respect to one another;

- a support member extending from the tubular body portion towards the anvil assembly, the support member having a proximal end extending radially outward from the elongate member of the tubular body and a distal end extending distally from the proximal end of the support member, wherein the distal end of the support member is radially located in the gap between the inner annular edge of the staple cartridge assembly and the elongate member, and wherein the distal end of the support member is coplanar with and does not extend beyond a

tissue contacting surface, wherein the tissue contacting surface is defined by the staple cartridge assembly; and

a buttress material supported by the support member and removably attached thereto, wherein the buttress material is disposed between the anvil assembly and the staple cartridge assembly, and wherein the buttress material overlays the annular array of surgical staples and extends radially inward of the distal end of the support member such that the distal end of the support member is entirely overlain by the buttress material.

[0013] In one embodiment, a surgical stapling device for joining tissue portions is disclosed. The surgical stapling device includes a handle assembly and a tubular body portion supported on a distal end of the handle assembly having a staple cartridge assembly containing a plurality of surgical staples in an annular array. An anvil assembly is at a distal end of the surgical stapling device and has a shaft for removably connecting the anvil assembly to the tubular body portion. The anvil assembly and tubular body portion are juxtaposed with respect to one another along the shaft and are arranged so as to be approximated with respect to one another. A support member extends from the tubular body portion towards the anvil assembly and a buttress material is supported by the support member and removably attached to the support member where the buttress material is disposed between the anvil assembly and the staple cartridge assembly.

[0014] In one embodiment the buttress material includes an attachment member which extends from the buttress material to the support member and is attachable to the support member to removably secure the buttress material to the support member. In another embodiment, the tubular body portion includes a plurality of support members and the buttress material is removably attachable to the plurality of support members. In another embodiment, the support member is disposed in an opening extending at least partially through the tubular body portion. In another embodiment, the support member extends distally from the opening in an axial

direction where a distal end of the support member is substantially radially aligned with a distal face of the tubular body portion. In another embodiment, the buttress material is positioned proximate to a tissue contacting surface of the staple cartridge assembly when the buttress material is attached to the support member.

[0015] In one embodiment the tubular body portion includes an elongate member extending axially therefrom and defining a passage extending at least partially therethrough for reception of the shaft of the anvil assembly. In another embodiment, the support member is radially disposed between the elongate member and the staple cartridge assembly. In another embodiment, the tubular body portion further includes a knife disposed between the elongate member and the tubular body portion. The knife is actuatable from a first proximal position to a second distal position to sever the tissue portions during firing of the surgical stapling device. In another embodiment, the support member is radially disposed between the elongate member and the knife.

[0016] In another embodiment, a surgical stapling device for joining tissue portions is disclosed. The surgical stapling device includes a handle assembly and a tubular body portion supported on a distal end of the handle assembly having a staple cartridge assembly containing a plurality of surgical staples in an annular array. An anvil assembly is at a distal end of the stapling device and has a shaft for removably connecting the anvil assembly to the tubular body portion. The anvil assembly and tubular body portion are juxtaposed with respect to one another along the shaft and are arranged so as to be approximated with respect to one another. An elongate member extends from the tubular body portion towards the anvil assembly and includes an opening extending at least partially therethrough for receiving the shaft of the anvil assembly. A buttress material is supported by the elongate member and removably attached thereto where the buttress material is disposed between the anvil assembly and the staple cartridge assembly.

[0017] In one embodiment, the elongate member defines a substantially circular platform at a distal end thereof and the buttress material is attachable to the circular platform. In another embodiment, the elongate member defines a proximal portion and a distal portion where the distal portion has an outer diameter which is larger than an outer diameter of the proximal portion and the circular platform is disposed on the distal portion. In another embodiment, the inner diameter of the proximal and distal portions are substantially the same. In another embodiment, the buttress material is adhered to a distal end of the elongate member. In another

embodiment, a distal end of the elongate member is substantially radially aligned with a distal end of the staple cartridge assembly.

[0018] A method of using buttress material with a surgical stapling device is also disclosed. The method including the steps of positioning the buttress material at least partially between an anvil assembly and a cartridge assembly of the surgical stapling device and extending from the cartridge assembly to a support member of the surgical stapling device, securing the buttress material to the support member, receiving body tissue between the anvil assembly and the cartridge assembly, grasping the body tissue between the anvil assembly and the cartridge assembly, and firing the surgical stapling device to drive a plurality of staples from the cartridge assembly through the buttress material and the body tissue to thereby secure a first portion of the buttress material to the body tissue.

[0019] In one embodiment, the step of firing the surgical stapling device includes the step of transitioning a knife between a first proximal position and a second distal position to sever the first portion of the buttress material from a second portion of the buttress material which is not secured to the body tissue, the second portion of the buttress material remaining secured to the support member. In another embodiment, the support member is disposed radially inward of the cartridge assembly with the knife disposed therebetween and the step of transitioning the knife includes the step of the knife severing the buttress material extending between the cartridge assembly and the support member. In another embodiment, the second portion of the buttress material is a plurality of attachment members extending from the first portion of the buttress material to the support member and the step of transitioning the knife includes the step of the knife severing the plurality of attachment members from the first portion of the buttress material.

BRIEF DESCRIPTION OF DRAWINGS

[0020] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the disclosure and, together with a general description of the disclosure given above and the detailed description of the embodiments given below, serve to explain the principles of the disclosure, wherein:

[0021] FIG. 1 is a perspective view of an exemplary annular surgical stapling device according to the present disclosure;

[0022] FIG. 2 is a perspective view of a buttress material in accordance with an embodiment of the present disclosure, for use with the annular surgical stapling device of FIG. 1;

[0023] FIG. 3 is an enlarged perspective view of an anvil assembly and a tubular body portion of the annular surgical stapling device of FIG. 1;

[0024] FIG. 4 is a top, plan view of the tubular body portion of FIG. 3, illustrating the support members of an embodiment of the present disclosure;

[0025] FIG. 5 is a top, plan view of the tubular body portion of FIG. 3, illustrating the buttress material supported on the support members;

[0026] FIG. 6 is a schematic, longitudinal, cross-sectional view of the anvil assembly and tubular body portion of FIG. 3, as taken through 6-6 of FIG. 3, illustrating the buttress material supported on the support members;

[0027] FIG. 7 is a schematic, perspective cut-away view of a tubular body portion of an annular surgical stapling device according to another embodiment of the present disclosure;

[0028] FIG. 8 is a schematic, longitudinal, cross-sectional view of the annular surgical stapling device of FIG. 7, as taken through 8-8 of FIG. 7;

[0029] FIG. 9 is a top, plan view of the tubular body portion of FIG. 7, illustrating a buttress material attached to a central shaft of the tubular body portion;

[0030] FIG. 10 is a plan view of a buttress material, according to another embodiment of the present disclosure, for use with an annular surgical stapling device;

[0031] FIG. 11 is a top, plan view of the buttress material of FIG. 10, illustrating the buttress material supported on the support members of a tubular body portion of the annular surgical stapling device;

[0032] FIG. 12 is a schematic, longitudinal, cross-sectional view of the annular surgical stapling device of FIG. 3, illustrating the buttress material of FIG. 10 supported on the support members of the tubular body portion with tissue disposed between the buttress material and the anvil assembly of the annular surgical stapling device; and

[0033] FIG. 13 is a perspective view of the intestinal area of a patient, illustrating a method of positioning the annular surgical stapling device of FIG. 1 to connect the anvil assembly to the tubular body portion.

DETAILED DESCRIPTION OF EMBODIMENTS

[0034] Embodiments of the presently disclosed annular surgical stapling device will now be described in detail with reference to the drawing figures wherein like reference numerals identify similar or identical elements. As used herein and as is traditional, the term “distal” refers to that portion which is furthest from the user while the term “proximal” refers to that portion which is closest to the user.

[0035] Referring initially to FIG. 1, an annular surgical stapling device for use with a buttress material is disclosed herein and is generally designated as 10. Surgical stapling device 10 includes a handle assembly 12 having at least one pivotable actuating handle member 14, and an advancing member 16. Extending from handle member 12, there is provided a tubular body portion 100 which may be constructed so as to have a curved shape along its length. Body portion 100 terminates in a staple cartridge assembly 102 which includes at least one annular array of staple receiving slots 104 having a staple (not shown) disposed in each one of staple receiving slots 104. For example, staple cartridge assembly may include one, two, or more than two annular arrays of staple receiving slots 104.

[0036] Staple cartridge assembly 102 may be fixedly connected to the distal end of tubular body portion 100 or may be configured to concentrically fit within the distal end of tubular body portion 100. Typically, staple cartridge assembly 102 includes a staple pusher (not shown) including a proximal portion having a generally frusto-conical shape and a distal portion defining two concentric rings of peripherally spaced fingers (not shown), each one of which is received within one of the respective staple receiving slots 104.

[0037] Typically, a knife (not shown), substantially in the form of an open cup with the rim thereof defining a knife edge, is disposed within staple cartridge assembly 102 and mounted to a distal surface of a staple pusher (not shown). The knife edge is disposed radially inward of the pair of annular arrays of staples. Accordingly, in use, as the staple pusher is advanced, the knife is also advanced axially outward.

[0038] Positioned distally of staple cartridge assembly 102 there is provided an anvil assembly 200 including an anvil member 202 and a shaft 204 operatively associated therewith for removably connecting anvil assembly 200 to a distal end portion of stapling device 10.

[0039] Reference may be made to U.S. Patent No. 5,915,616 to Viola et al., the entire contents of which are incorporated herein by reference, for a detailed discussion of the construction and operation of annular stapling device 10. U.S. Patent No. 5,915,616 to Viola et al. is hereby incorporated by reference herein, in its entirety.

[0040] Referring now to FIGS. 1, 3, 4, 5 and 6, body portion 100 of stapling device 10 includes a plurality of support members 108 extending from a central shaft 110. One or more support members 108 are adapted to support and secure a buttress material 300 adjacent to or proximate to a tissue contacting surface 106 of staple cartridge assembly 102. As seen in FIG. 6, each support member 108 includes a base portion 112 extending radially outward from a proximal portion 114 of central shaft 110 and an attachment portion 116 extending distally from base portion 112. It is contemplated that each base portion 112 may alternatively extend from central shaft 110 at any position along its length up to and including a distal end 118 of central shaft 110, where, for example, each base portion 112 may extend from central shaft 110 at a middle portion 120 or at distal end 118. It is also contemplated that each support member 108 may extend directly from tubular body portion 100 rather than central shaft 110.

[0041] It is contemplated that each attachment portion 116 may be radially spaced from central portion 110 or may be adjacent to or abutting central portion 110 where no base portion 112 would be necessary. Any number of support members 108 may be provided at various positions radially about central portion 110, such as, for example, one, two, four or more support members 108. Support members 108 may be positioned radially about central shaft 110 in any configuration where, for example, each support member may be offset by ninety degrees (See FIGS. 4 and 5) or may be offset by more degrees or less degrees as desired. It is also

contemplated that the offset between a first adjacent pair of support members 108 may be greater or less than the offset between a second adjacent pair of support members 108. As seen in FIGS. 4 and 5, attachment portions 116 of each support member 108 may be positioned at a different spacing from central portion 110 and multiple support members 108 having attachment portions 116 with different spacing from central portion 110 may be included at the same time.

[0042] Base portions 112 of support members 108 may define a linear shape or may instead define an arcuate shape where, for example, a portion of base portions 112 curve distally away from central portion 110.

[0043] Each support member 108 may define a transverse cross-section having a substantially square shape or may define a transverse cross-section having a circular, oval, rectangular, triangular, polygonal or other shape suitable for supporting a buttress material 300 on a distal end 122 of the support member 108. It is contemplated that the transverse cross-section of base portion 112 and attachment portion 116 of each support member 108 may be substantially the same or that the base portion 112 and attachment portion 116 may have different transverse cross-sections.

[0044] Distal end 122 of each support member 108 may permanently or removably secure buttress material 300 in place and buttress material 300 may be attached to distal end 122 of each support member 108 by various methods including, for example, adhesives, ultrasonic welding, tacking, stapling, hook and loop, or other methods of attachment which are suitable to either permanently affix or removably affix buttress material 300 to each support member 108.

[0045] As seen in FIG. 6, distal end 122 of each support member 108 may be positioned at the same radial plane as tissue contacting surface 106 of staple cartridge assembly 102 relative to central shaft 110 where, when buttress material 300 is affixed or attached to support member 108, buttress material 300 defines a substantially linear radial configuration between support 108 and tissue contacting surface 106 of staple cartridge assembly 102. It is also contemplated that distal end 122 of each support member 108 may be located longitudinally proximal or distal of tissue contacting surface 106 of staple cartridge assembly 102.

[0046] Referring now temporarily to FIG. 2, buttress material 300 is generally annular in shape and includes an inner portion 302, a middle portion 304, and an outer portion 306. A

substantially centrally located aperture 308, defined by the inner circumference of inner portion 302 is formed through buttress material 300. Buttress material 300 may be any shape sufficient to provide support for anastomosis of tissue after surgical stapling device 10 has been fired including, for example, a square, a circle, an oval, a triangle or any other polygonal or other shape.

[0047] In one embodiment, as seen in FIG. 6, buttress material 300 is sized such that when buttress material 300 is affixed or attached to support members 108, outer portion 306 of buttress material 300 extends radially beyond staple receiving slots 104 (See FIGS. 3-5) of staple cartridge assembly 102. Additionally, aperture 308 of buttress material 300 is sized to at least receive shaft 204 of anvil assembly 200 therethrough. Aperture 308 of buttress material 300 may also be sized to receive central shaft 110 of tubular body portion 100 therethrough. In another embodiment, the distance between outer portion 306 of buttress material 300 and inner portion 302 of buttress material 300 is substantially equal to a width of a tissue contacting surface 106 of staple cartridge assembly 102.

[0048] Each portion 302, 304, and 306 of buttress material 300 may be fabricated from surgical grade, biocompatible, non-absorbable material (i.e. permanent) or absorbable material (i.e. non-permanent) mesh or material desirably impregnated with an adhesive, sealant and/or other medicament. It is also contemplated that each portion may be a composite of both a non-absorbable and an absorbable material. Suitable materials for the fabrication of buttress material 300 and suitable adhesives, sealants, and/or medicaments for impregnation in or application to buttress material 300 may be found, for example, in U.S. Patent No. 7,942,890, referenced above. U.S. Patent No. 7,942,890 is hereby incorporated by reference herein, in its entirety.

[0049] In another embodiment of the present disclosure, as seen in FIGS. 7-9, an annular surgical stapling device 1000 is disclosed including a tubular body portion 1100 which is similar to tubular body portion 100. In this embodiment, a staple cartridge assembly 1102 of tubular body portion 1100 includes a central shaft 1110 having a proximal portion 1114 with a first smaller thickness and a distal portion 1116 with a second larger thickness. For example, central shaft 1110 defines an inner diameter which is substantially the same for both the proximal and distal portions 1114 and 1116 for receiving the shaft 204 of anvil assembly 200. The outer diameter of central shaft 1110 is smaller at the proximal portion 1114 and larger at the distal

portion 1116. The difference between the inner and outer diameters defines a platform 1120 at a distal end 1118 of central shaft 1110 for supporting buttress material 300.

[0050] Central shaft 1110 may transition from the smaller outer diameter to the larger outer diameter gradually along the longitudinal length of central shaft 1110 where, for example, the outer diameter gradually tapers outward from proximal to distal, or central shaft 1110 may transition from the smaller outer diameter to the larger outer diameter by defining an arcuate transition portion 1124, as seen in FIGS. 7 and 8. It is contemplated that central shaft 1110 may have any configuration for transitioning from the smaller outer diameter at the proximal portion 1114 to the larger outer diameter at the distal portion 1116 to increase the thickness of central shaft 1110 at the distal portion 1116 thereof to provide platform 1120, including, for example, a gentle tapered transition, an arcuate transition, or a radial extrusion from proximal portion 1114.

[0051] Platform 1120 may define any shape suitable for providing an attachment surface for securing buttress material 300. For example, platform 1120 may be circular, square, rectangular, triangular, oval, starred, spoked, or any other polygonal shape or suitable shape.

[0052] As discussed above, buttress material 300 may be attached to platform 1120 through any means of attachment or affixation including, for example, adhesives, ultrasonic welding, tacking, stapling, hook and loop, or other methods of attachment which are suitable to either permanently affix or removably affix buttress material 300 to platform 1120. For example, platform 1120 may include attachment points 1122 (See FIG. 9) for receiving and securing buttress material 300 to platform 1120. It is contemplated that support members, as described above, may also be included to assist in supporting and affixing buttress material 300. The attachment methods disclosed in U.S. Patent Application No. 13/094,893, filed April 27, 2011, may also be used to attach the buttress material to the support member or platform discussed above. U.S. Patent Application No. 13/094,893 is hereby incorporated by reference herein, in its entirety. The buttresses disclosed herein may be made from the materials disclosed in U.S. Patent Application No. 13/094,893, filed April 27, 2011. U.S. Patent Application No. 13/094,893 is hereby incorporated by reference herein, in its entirety.

[0053] In another embodiment of the present disclosure, as seen in FIGS. 10-12, a buttress material 3000 is disclosed which is similar to buttress material 300. Buttress material 3000 includes an inner portion 3002, a middle portion 3004, an outer portion 3006 and defines an

aperture 3008 therethrough. In this embodiment, aperture 3008 is substantially larger than central shaft 110 of tubular body portion 100 where, for example, aperture 3008 may have a diameter substantially equal to the inner diameter of staple cartridge assembly 102. It is contemplated that aperture 3008 may also be smaller than the inner diameter of staple cartridge assembly 102.

[0054] Buttress material 3000 is configured for positioning adjacent tissue contacting surface 106 of staple cartridge assembly 102 and may define a donut like shape which is substantially equivalent in width to the width of tissue contacting surface 106. It is contemplated that buttress material 3000 may alternatively have a width which is greater than that of tissue contacting surface 106 and that buttress material 300 may extend radially outward past tissue contacting surface 106 and/or radially inward towards support members 108 and central shaft 110.

[0055] Buttress material 3000 is securable to support members 108 through the use of a plurality of attachment members 3010 extending from inner portion 3002 into aperture 3008 towards central shaft 110. Attachment members 3010 allow buttress material 3000 to be supported by and attached or affixed to support members 108 with a minimal amount of material. This reduces overall costs for buttress material 3000 and reduces the force necessary to separate attachment members 3010 from the rest of buttress material 3000, during firing by, for example, a knife. Attachment members 3010 may be configured to break away or to be severed from buttress material 3000 after or during firing and may include perforations, shearable sections, or other mechanisms suitable to facilitating the separation of attachment members 3010 from the rest of buttress material 3000.

[0056] Attachment members 3010 may be attached or affixed to attachment portion 116 of support members 108 in the same manner as described above with regard to buttress material 300 including, for example, adhesives, ultrasonic welding, tacking, stapling, hook and loop, or other methods of attachment which are suitable to either permanently affix or removably affix attachment members 3010 to support members 108.

[0057] Attachment members 3010 may define a rectangular shape or may define other shapes including, for example, triangular, square, semicircular, or other shapes suitable for supporting buttress material 3000 and attaching or affixing buttress material 3000 to support members 108 or platform 1020.

[0058] Buttress material 3000 and attachment members 3010 may be made from any of the materials describe above for buttress material 300 and found in U.S. Patent Number 7,942,890, referenced above. One or more of inner portion 3002, middle portion 3004, outer portion 3006 and attachment members 3010 may be made from the same material or one or more of inner portion 3002, middle portion 3004, outer portion 3006, and attachment members 3010 may be made from different materials.

[0059] Turning now to FIGS. 12 and 13, there is illustrated the use of annular surgical stapling device 10 and detachable anvil assembly 200 in an anastomosis procedure to effect joining of intestinal sections 20 and 22. The anastomosis procedure is typically performed using minimally invasive surgical techniques including laparoscopic means and instrumentation. At the point in the procedure shown in FIG. 13, a diseased intestinal section has been previously removed, anvil assembly 200 has been applied to the operative site either through a surgical incision or transanally and positioned within intestinal section 22, and tubular body portion 100 of annular surgical stapling device 10 has been inserted transanally into intestinal section 20. Intestinal sections 20 and 22 are also shown temporarily secured about their respective components (e.g., shaft 204 of anvil assembly 200, and the tissue contacting surface 106 of tubular body portion 100).

[0060] According to one method, as seen in FIGS. 6, 8, 12, and 13, buttress material 300 may be placed onto support members 108 of tubular body portion 100 (or platform 1120 of tubular body portion 1000) prior to the coupling of anvil assembly 200 to the central shaft 110 of tubular body portion 100. Tubular body portion 100 may come with buttress material 300 pre-attached to support members 108 (or platform 1120). Alternatively the surgeon may attach buttress material 300 to support members 108 (or platform 1120) prior to use. With buttress material 300 secured in place, the surgeon maneuvers anvil assembly 200 until the proximal end of shaft 204 is inserted into the central shaft 110 of tubular body portion 100. Central shaft 110 is now engaged to shaft 204 with intestinal sections 20 and 22 disposed between anvil assembly 200 and staple cartridge assembly 102. As seen in FIG. 12, for example, buttress material 300 is disposed between cartridge assembly 102 and intestinal sections 20 and 22.

[0061] Anvil assembly 200 and tubular body portion 100 are then approximated to approximate intestinal sections 20, 22 and capture buttress material 300 between intestinal section 20 and tissue contacting surface 106 of staple cartridge assembly 102. Surgical stapling

device 10 is then fired to staple buttress material 300 and intestinal sections 20, 22 together and the knife is actuated to cut the portion of tissue and buttress material 300 disposed radially inward of the knife, to complete the anastomosis. For example, the knife may cut through a portion of buttress material 300 and may be aligned with perforations or other shearable sections of buttress material 300 to require less force for cutting. Alternatively when a buttress material 3000, having attachment members 3010 is provided, the knife may cut through a portion of each attachment member 3010 near inner portion 3002 of buttress material 3000 where, for example, less force is required to cut through attachment members 3010 than to cut through buttress material 300 because less material is provided in the path of the knife.

[0062] While the use of surgical stapling device 10 has been shown and described, it is understood and within the scope of the present disclosure that surgical stapling device 1000 may be operated in the same or similar manner.

[0063] While several configurations of support members and platforms have been illustrated and described, it will also be apparent that various modifications can be made without departing from the spirit and scope of the present disclosure. For example, it is envisioned and within the scope of the present disclosure for a greater or smaller number of support members to be provided. It is also envisioned that the spacing of support members from the central shaft may be adjusted and that the spacing or circumferential position of the support members about the central shaft may be adjusted. It is also envisioned that a thicker or thinner central shaft with a larger or smaller platform may be provided.

[0064] Thus, it should be understood that various changes in form, detail and application of the buttress materials of the present disclosure may be made without departing from the spirit and scope of the present disclosure.

CLAIMS:

1. A surgical stapling device for joining tissue portions, comprising:
 - a handle assembly;
 - a tubular body portion supported on a distal end of the handle assembly, the tubular body portion having a staple cartridge assembly containing a plurality of surgical staples in an annular array, and an elongate member extending axially therefrom and defining a distal surface, the staple cartridge assembly defining an inner annular edge, wherein a gap is defined between the inner annular edge of the staple cartridge assembly and the elongate member;
 - an anvil assembly at a distal end of the surgical stapling device, the anvil assembly having a shaft for removably connecting the anvil assembly to the tubular body portion, the anvil assembly and tubular body portion being juxtaposed with respect to one another along the shaft and arranged so as to be approximated with respect to one another;
 - a support member extending from the tubular body portion towards the anvil assembly, the support member having a proximal end extending radially outward from the elongate member of the tubular body and a distal end extending distally from the proximal end of the support member, wherein the distal end of the support member is radially located in the gap between the inner annular edge of the staple cartridge assembly and the elongate member, and wherein the distal end of the support member is coplanar with and does not extend beyond a tissue contacting surface, wherein the tissue contacting surface is defined by the staple cartridge assembly; and
 - a buttress material supported by the support member and removably attached thereto, wherein the buttress material is disposed between the anvil assembly and the staple cartridge assembly, and wherein the buttress material overlays the annular array of surgical staples and extends radially inward of the distal end of the support member such that the distal end of the support member is entirely overlain by the buttress material.
2. A surgical stapling device according to claim 1, wherein the buttress material includes an attachment member extending from the buttress material to the support member, the attachment member being attachable to the support member to removably secure the buttress material to the support member.

3. A surgical stapling device according to claim 1, wherein the tubular body portion includes a plurality of support members, the buttress material being removably attachable to the plurality of support members.
4. A surgical stapling device according to claim 1, wherein the buttress material is positioned proximate to a tissue contacting surface of the staple cartridge assembly when the buttress material is attached to the support member.
5. A surgical stapling device according to claim 1, wherein the elongate member defines a passage extending at least partially therethrough for reception of the shaft of the anvil assembly.
6. A surgical stapling device according to claim 5, wherein the tubular body portion further includes a knife disposed between the elongate member and the tubular body portion, the knife actuatable from a first proximal position to a second distal position to sever the tissue portions during firing of the surgical stapling device.
7. A surgical stapling device according to claim 6, wherein the support member is radially disposed between the elongate member and the knife.

Covidien LP

Patent Attorneys for the Applicant/Nominated Person

SPRUSON & FERGUSON

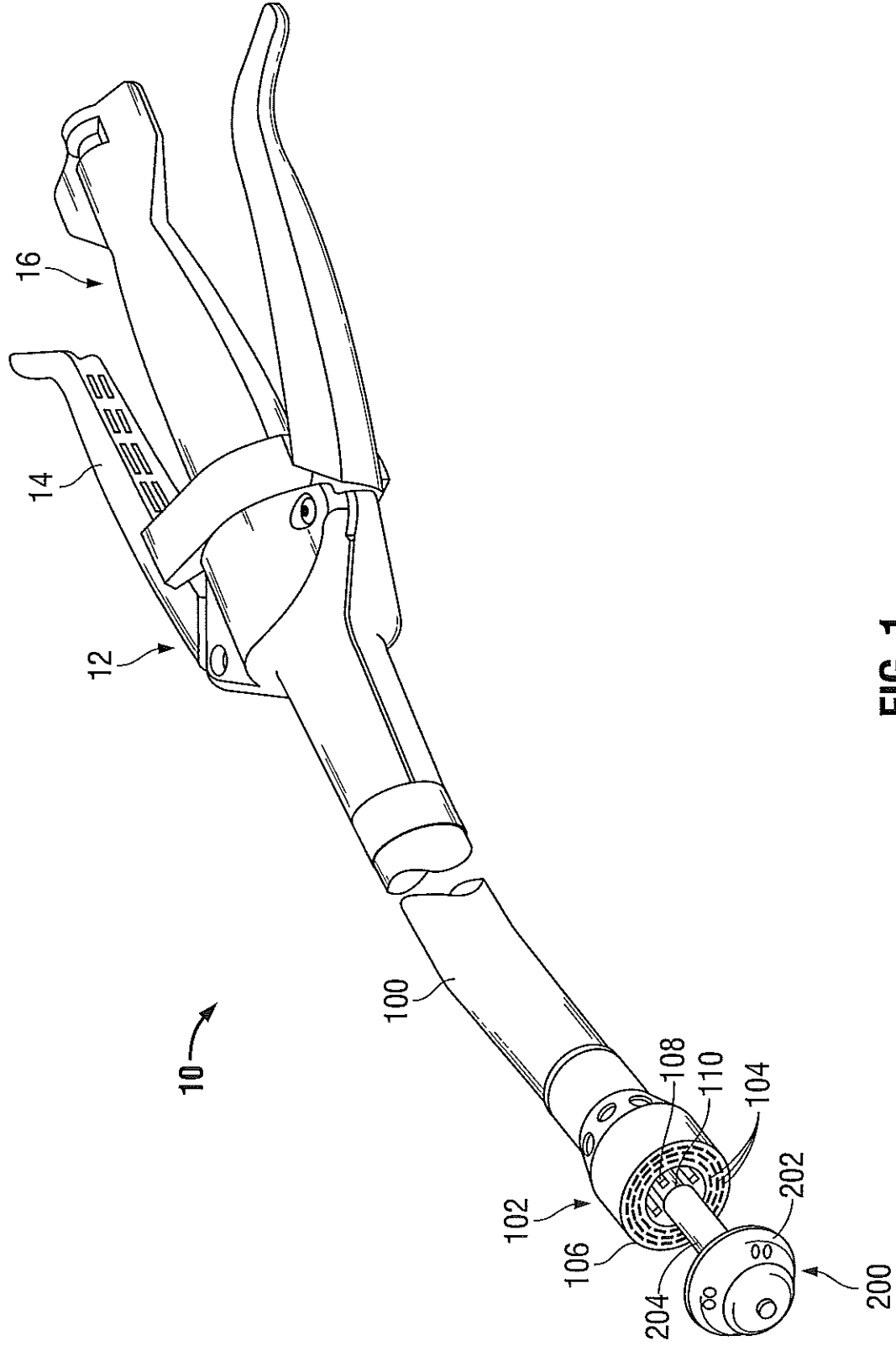


FIG. 1

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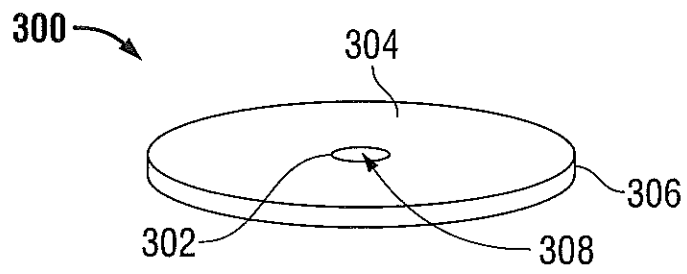


FIG. 2

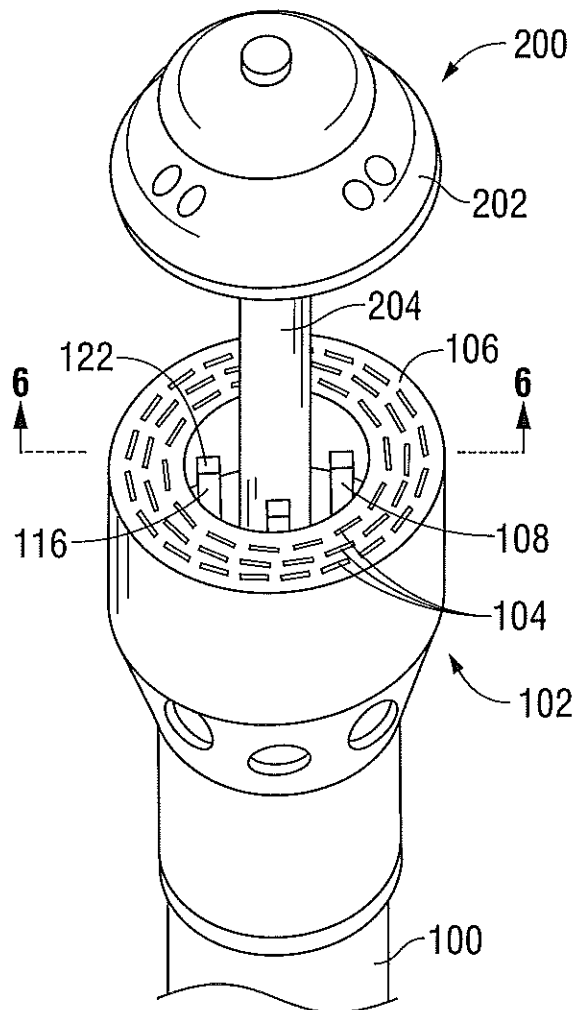


FIG. 3

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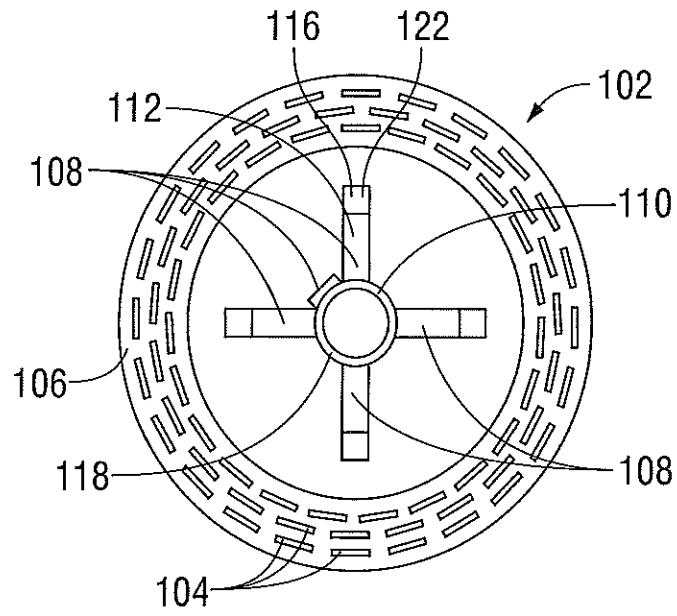


FIG. 4

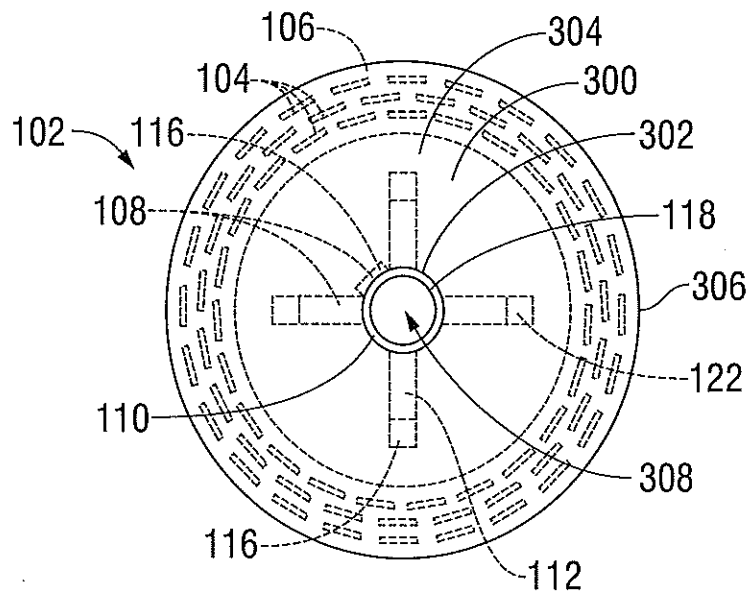


FIG. 5

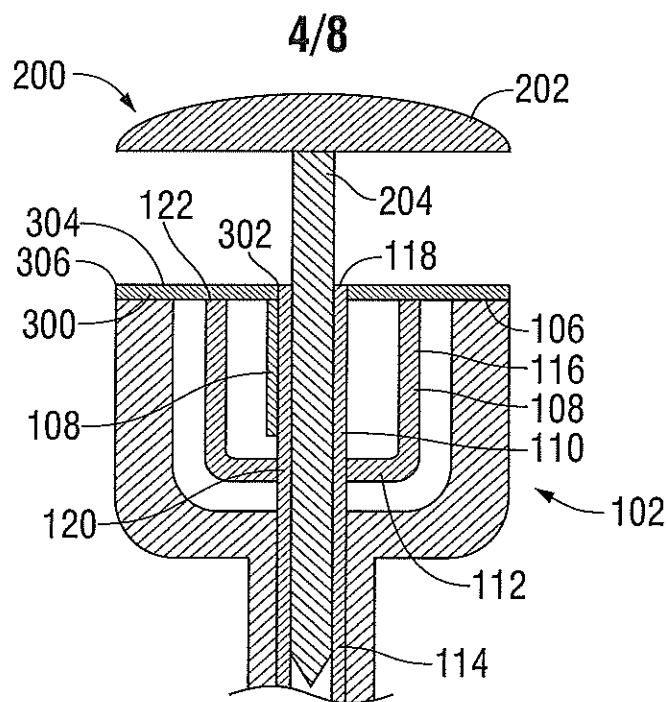


FIG. 6

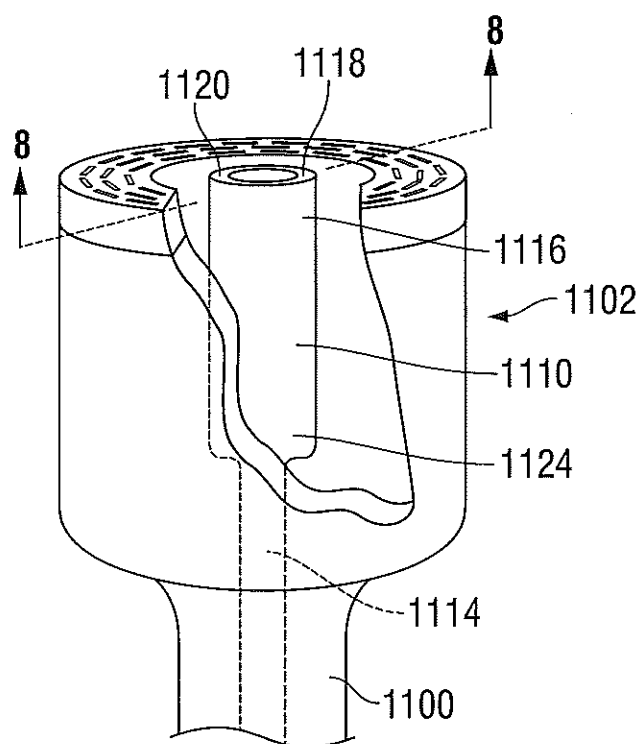
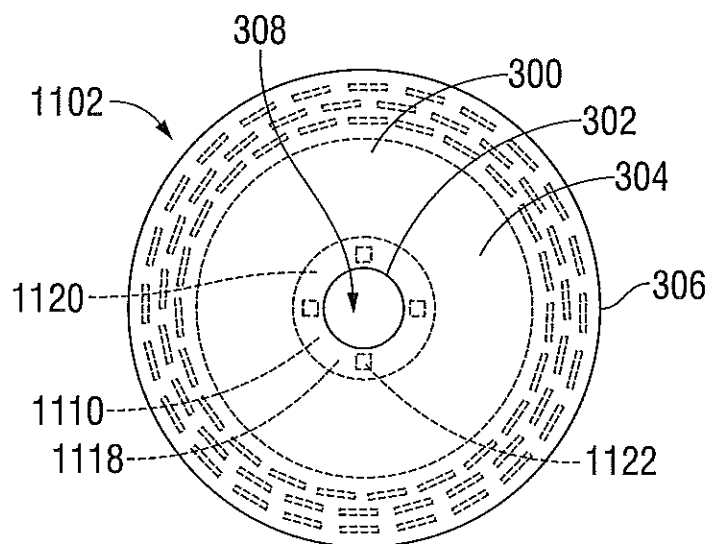
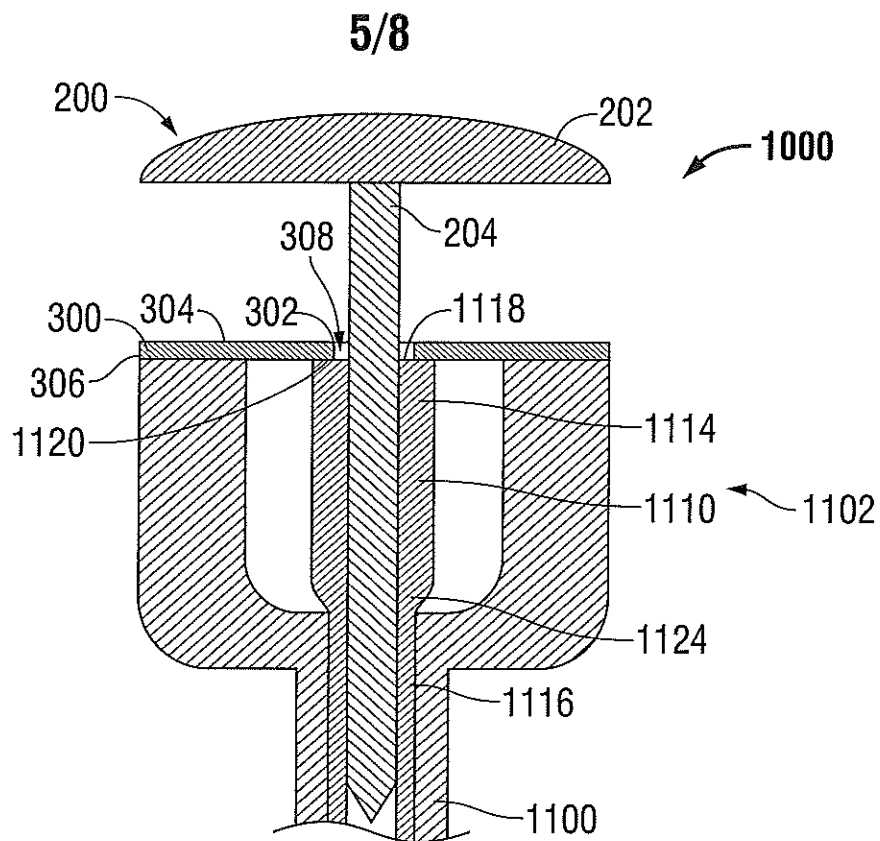


FIG. 7



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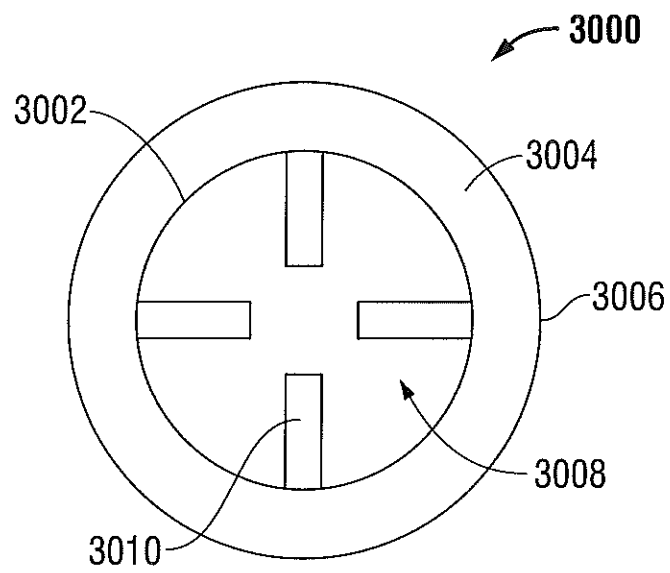


FIG. 10

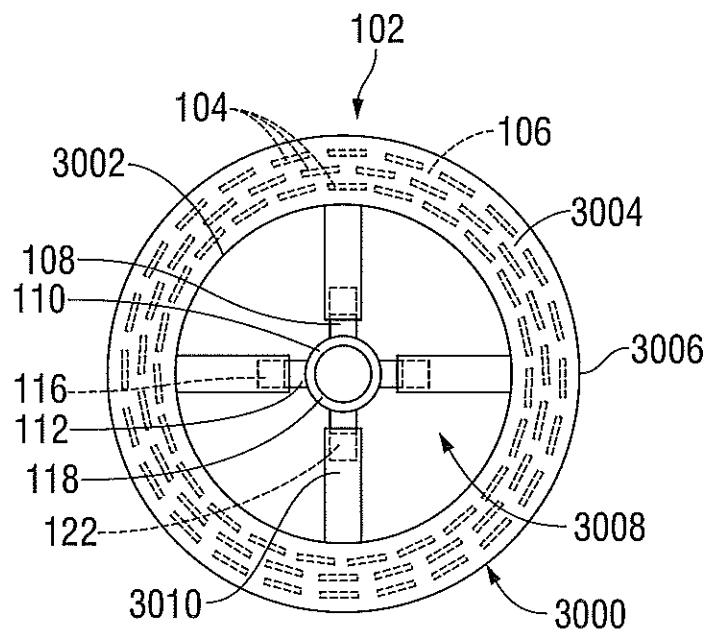


FIG. 11

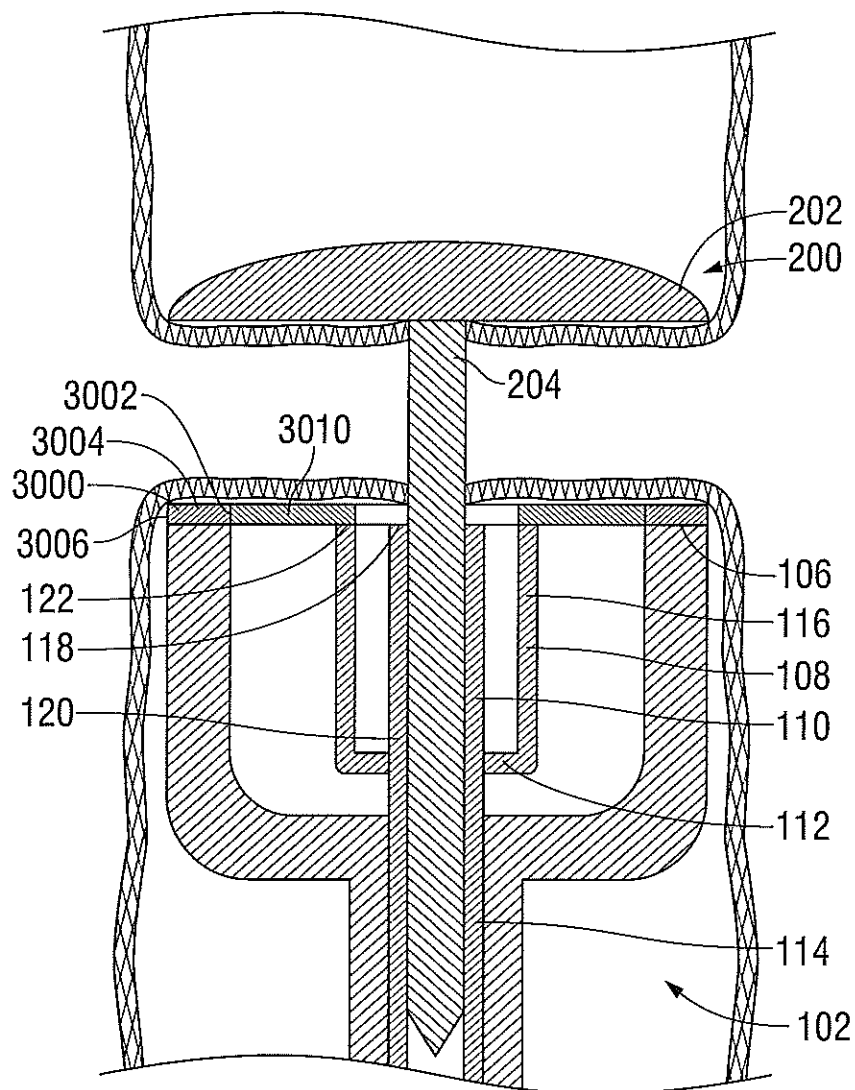


FIG. 12

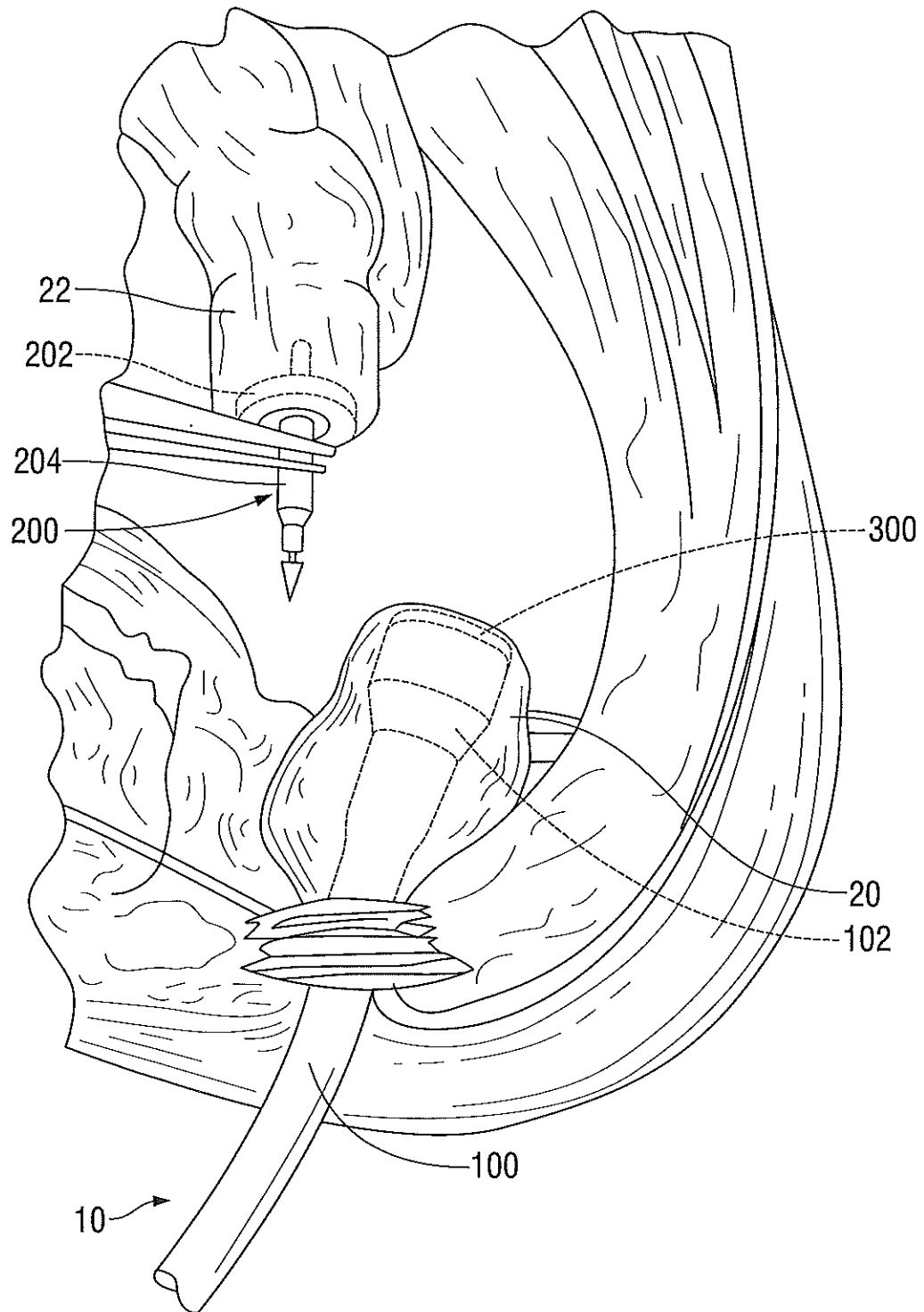


FIG. 13