



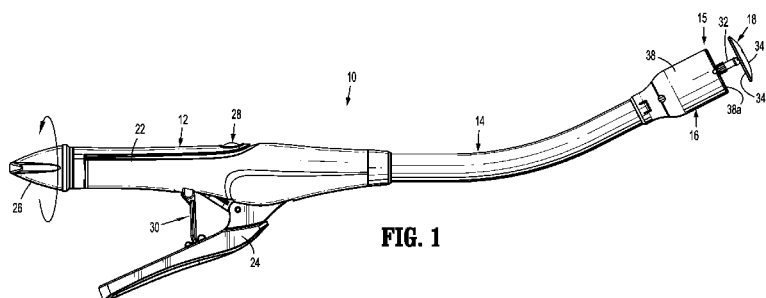
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(54) **Title:** CIRCULAR STAPLER WITH VISUAL INDICATOR MECHANISM



(57) **Abstract:** A surgical stapling device (10) includes a visual indicator mechanism (28) that provides a clinician with greater visualization of the movement of an anvil assembly (18) in relation to a cartridge assembly (16) after the anvil assembly (18) and cartridge assembly (16) have been approximated to within a firing zone. The visual indicator mechanism (28) improves visualization of the different degrees of approximation within the firing zone by providing an indicator cover (62) having spaced slots (76a-c) that allow indicia (84) formed on an indicator member (60) to sequentially appear within the spaced slots (76a-c) to identify the different degrees of approximation within the firing zone.



CIRCULAR STAPLER WITH VISUAL INDICATOR MECHANISM

BACKGROUND

1. Technical Field

[0001] The present disclosure relates to surgical stapling devices, and more particularly, to circular stapling devices that include visual indicator mechanisms for indicating when the surgical stapling device is in a fire-ready zone.

2. Background of Related Art

[0002] Anastomosis is the surgical joining of separate hollow organ sections. In known circular anastomosis procedures, two ends of organ sections are joined by means of a surgical stapling device that drives a circular array of staples through each organ section and simultaneously cores any tissue interior of the driven circular array of staples to free a tubular passage. Examples of such devices are described in U.S. Pat. Nos. 7,234,624, 6,945,444, 6,053,390, 5,568,579, 5,119,983, 4,646,745, 4,576,167, and 4,473,077, the content of each of which is incorporated herein by reference in its entirety.

[0003] Typically, a circular stapling device has an elongated shaft having a handle portion supported at a proximal end of the shaft and a staple cartridge supported at a distal end of the shaft. An anvil assembly including an anvil rod and an anvil head is also mounted to the distal end of the device. The anvil head is approximated in relation to the staple cartridge to clamp tissue between the staple cartridge and the anvil head of the anvil assembly.

[0004] Known surgical stapling devices include an indicator mechanism that provides an indication to a clinician that the anvil head of the anvil assembly has been moved into a firing zone in close approximation with a staple cartridge of the cartridge assembly. The firing zone is the zone

of approximation in which the anvil head is positioned in close enough approximation with the staple cartridge to facilitate the proper formation of staples. Due to the small size of the staples being fired and, thus, the limited size of the firing zone, it can be difficult for a clinician to accurately identify using known visual indicator mechanisms exactly where the anvil head is in relation to the staple cartridge in the firing zone.

[0005] It would be advantageous to provide a surgical stapling device including a visual indicator mechanism capable of accurately identifying to a clinician the location of the anvil head within the firing zone during approximation of the anvil head and the staple cartridge.

SUMMARY

[0006] The presently disclosed visual indicator mechanism and surgical stapling device including such a visual indicator mechanism is provided to afford a clinician greater visualization of the movement of an anvil assembly in relation to a cartridge assembly after the anvil and cartridge assemblies have been approximated to within a firing zone, i.e., the zone of approximation in which the anvil head and staple cartridge are in close enough approximation to allow for the proper formation of staples against the anvil assembly. The visual indicator mechanism improves visualization of the different degrees of approximation within the firing zone by providing an indicator cover having spaced slots that allow indicia formed on an indicator member to sequentially appear within the spaced slots to identify the different degrees of approximation within the firing zone. Improving visualization of the position of the anvil head in relation to the staple cartridge of the cartridge assembly during approximation of the anvil head and staple cartridge within the firing zone allows the clinician to better control the degree of approximation to compensate for different tissue thicknesses.

[0007] In one aspect of the present disclosure, a surgical stapling device includes a handle assembly having a stationary handle defining a window and a firing trigger. A central body extends

distally from the handle assembly. A cartridge assembly is supported on a distal end of the central body and an anvil assembly is supported on the distal end of the stapling device. An approximation mechanism includes a longitudinally movable drive screw that is operatively connected to the anvil assembly such that longitudinal movement of the drive screw between advanced and retracted positions effects movement of the anvil assembly in relation to the cartridge assembly between spaced and approximated positions. The drive screw supports an abutment. A visual indicator mechanism includes an indicator cover, an indicator and an indicator plate. The indicator cover is supported on the stationary handle above the window and defines a plurality of spaced slots. The indicator is positioned beneath the indicator cover adjacent the window and supports indicia. An indicator plate is movable from an advanced position to a retracted position within the stationary handle. The indicator plate supports a stop member and has a distal end connected to the indicator. The stop member is positioned to engage the abutment such that movement of the drive screw between the advanced and retracted positions effects movement of the indicator within the indicator cover between first and second positions, wherein the indicia are dimensioned and configured such that movement of the indicator within the indicator cover as the indicator plate is moved from the advanced position to the retracted position causes the indicia to become sequentially visible within the plurality of slots.

[0008] In embodiments, the visual indicator mechanism includes a biasing member supported within the stationary handle and positioned to urge the indicator plate towards the advanced position.

[0009] In embodiments, the indicia include a plurality of spaced colored bands.

[0010] In some embodiments, the plurality of slots includes first, second and third slots, and the plurality of spaced colored bands includes first, second, and third colored bands.

[0011] In certain embodiments, when the indicator is in the first position, the first colored band is spaced from the first slot a first distance, the second colored band is spaced from the second slot a second distance, and the third colored band is spaced from the third slot a third distance,

wherein the first distance is greater than the second and third distances and the second distance is greater than the third distance.

[0012] In embodiments, the first colored band has a first width, the second colored band has a second width and the third colored band has a third width, the first width being less than the second and third widths and the second width being less than the third width.

[0013] In some embodiments, the indicator is pivotally supported beneath the indicator cover within the stationary handle.

[0014] In certain embodiments, the indicator plate includes a coupling member defining an elongated slot and the indicator includes an engagement member, the engagement member being received within the elongated slot to couple the indicator to the indicator plate.

[0015] In embodiments, the indicator plate includes a proximally extending portion and the stationary handle includes a bracket defining a cutout. The proximally extending portion extends through the cutout to guide movement of the indicator plate within the stationary handle.

[0016] In some embodiments, the biasing member is positioned in compression about the proximally extending portion between the bracket and a central portion of the indicator plate to urge the indicator plate in a distal direction.

[0017] In certain embodiments, the indicia include a stepped colored band and the plurality of slots includes first, second and third slots that are laterally and longitudinally spaced from each other.

[0018] In embodiments, the plurality of slots includes first, second and third slots, and the stepped colored band includes first, second, and third steps.

[0019] In some embodiments, when the indicator is in the first position, the first step of the colored band is spaced from the first slot a first distance, the second step of the colored band is spaced from the second slot a second distance, and the third step of the colored band is spaced from the third slot a third distance, wherein the first distance is greater than the first and second distances and the second distance is greater than the third distance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Various embodiments of a surgical stapling device including the presently disclosed visual indicator mechanism are described herein below with reference to the drawings, wherein:

[0021] FIG. 1 is a perspective view of a surgical stapling device including one embodiment of the presently disclosed visual indicator mechanism with the end effector in an unapproximated position;

[0022] FIG. 2 is an enlarged view of the distal end of the surgical stapling device shown in FIG. 1 with the end effector in an approximated position and tissue clamped between an anvil head of the anvil assembly and the staple cartridge of a cartridge assembly;

[0023] FIG. 3 is a side view of the handle assembly of the surgical stapling device shown in FIG. 1 with a handle half-section removed illustrating the visual indicator mechanism;

[0024] FIG. 3A is a side, perspective, exploded view of the visual indicator mechanism of the surgical stapling device shown in FIG. 1;

[0025] FIG. 4 is a top view of the indicator of the visual indicator mechanism shown in FIG. 3A;

[0026] FIG. 5 is a top, cutaway view of the handle assembly of the surgical stapling device shown in FIG. 1 from above the indicator cover prior to approximation of the anvil head into the firing zone showing colored bands of the indicator in phantom;

[0027] FIG. 6 is a top, cutaway view of the handle assembly of the surgical stapling device shown in FIG. 1 from above the indicator cover with the anvil head approximated into the firing zone to a maximum tissue gap;

[0028] FIG. 7 is a top, cutaway view of the handle assembly of the surgical stapling device shown in FIG. 1 from above the indicator cover with the anvil head approximated into the firing zone to an intermediate tissue gap ;

[0029] FIG. 8 is a top, cutaway view of the handle assembly of the surgical stapling device shown in FIG. 1 from above the indicator cover with the anvil head approximated into the firing zone to a minimum tissue gap;

[0030] FIG. 9 is a top view of the indicator of another embodiment of the presently disclosed visual indicator mechanism;

[0031] FIG. 10 is a top, cutaway view of the handle assembly of a surgical stapling device as shown in FIG. 1 including the visual indicator mechanism of FIG. 9 from above the indicator cover the anvil head approximated into the firing zone to a maximum tissue gap;

[0032] FIG. 11 is a top, cutaway view of the handle assembly of a surgical stapling device as shown in FIG. 1 from above the indicator cover with the anvil head approximated into the firing zone to an intermediate tissue gap; and

[0033] FIG. 12 is a top, cutaway view of the handle assembly of a surgical stapling device as shown in FIG. 1 from above the indicator cover with the anvil head approximated into the firing zone to a minimum tissue gap;

DETAILED DESCRIPTION OF EMBODIMENTS

[0034] A surgical stapling device including embodiments of the presently disclosed visual indicator mechanism will now be described in detail with reference to the drawings in which like reference numerals designate identical or corresponding elements in each of the several views. In this description, the term “proximal” is used generally to refer to the portion of the device that is closer to a clinician, while the term “distal” is used generally to refer to the portion of the device that

is farther from the clinician. In addition, the term “endoscopic” is used generally to refer to procedures including endoscopic, laparoscopic, and arthroscopic performed through a small incision or a cannula inserted into a patient’s body. Finally, the term clinician is used generally to refer to medical personnel including doctors, nurses, and support personnel.

[0035] The presently disclosed visual indicator mechanism is provided to afford a clinician greater visualization of the movement of an anvil assembly in relation to a cartridge assembly after the anvil and firing assemblies have been approximated to within a firing zone, i.e., the zone of approximation in which the anvil head and staple cartridge are in close enough approximation to allow for the proper formation of staples against the anvil assembly. Improving visualization of the position of the anvil head in relation to the staple cartridge of the cartridge assembly during approximation of the anvil head and staple cartridge within the firing zone allows the clinician to better control the degree of approximation to compensate for different tissue thicknesses.

[0036] FIGS. 1 and 2 illustrate one embodiment of a surgical stapling device 10 including one embodiment of the presently disclosed visual indicator mechanism as described in further detail below. Briefly, surgical stapling device 10 includes a handle assembly 12, a central body or elongated portion 14, and an end effector 15 including a shell or cartridge assembly 16 and an anvil assembly 18. Although the central body portion 14 is shown to be slightly curved, it is to be understood that the central body portion 14 can be straight or have any degree of curvature suitable to perform a desired surgical procedure.

[0037] Except where otherwise noted, the components of stapling device 10 are generally formed from thermoplastics including polycarbonates, and metals including stainless steel and aluminum. The particular material selected to form a particular component will depend upon the strength requirements of the particular component and upon whether the component is a reusable or disposable component. For example, the anvil assembly 18 may be formed from metal such as stainless steel, whereas portions of handle assembly 12 may be formed from thermoplastics such as a

polycarbonate. In addition, the handle assembly 12 may be formed of an autoclavable material to allow for reuse whereas portions of the cartridge assembly may be formed of thermoplastics to allow for disposal. It is envisioned that other materials having the requisite strength requirements which are suitable for surgical use may be used to form the components of surgical stapling device 10.

[0038] Handle assembly 12 includes a stationary handle 22, a firing trigger 24, an approximation knob 26, a visual indicator mechanism or indicator assembly 28, and a lockout mechanism 30. The approximation knob 26 functions to retract and advance a drive screw 40 (FIG. 3) to advance or retract the anvil assembly 18 in relation to the cartridge assembly 16 between spaced and approximated positions as described below. The lockout mechanism 30 functions to prevent actuation of the firing trigger 24 until the cartridge and anvil assemblies 16, 18 have been approximated into a firing zone, i.e., the zone of approximation in which the anvil head and staple cartridge are in close enough approximation to allow for the proper formation of staples against the anvil assembly. During firing of the surgical stapling device 10, the firing trigger 24 functions to actuate a pusher (not shown) to eject staples from cartridge assembly 16 after the cartridge and anvil assemblies 16, 18, respectively, have been approximated within the firing zone to form the staples against the anvil assembly 18.

[0039] Each of the components of handle assembly 12 identified above except for the indicator assembly 28 which is described in detail below, is substantially as described in U.S. Pat. No. 7,303,106 ("the '106 Patent") which is incorporated herein by reference in its entirety. Only those components of the handle assembly 12 that interact with the presently disclosed indicator assembly 28 will be described in further detail herein.

[0040] The anvil assembly 18 includes an anvil shaft or center rod 32 and an anvil head 34. In embodiments, the anvil head 34 is pivotally mounted to the distal end of anvil shaft 32 such that the anvil head 34 can move between an operative non-tilted position and a tilted reduced profile position (not shown). Such an anvil assembly 18 is described in detail in the '106 Patent. Alternately,

the anvil assembly 18 may include an anvil head 34 that is fixedly secured to the anvil center rod 32. The anvil head 34 supports an anvil plate 34a that includes a plurality of staple forming depressions (not shown) and is movable into close approximation with the cartridge assembly 16 to deform staples ejected from the cartridge assembly 16.

[0041] The cartridge assembly 16 is secured to the distal end of central body portion 14 of the surgical stapler 10 and includes a shell or housing 38. The housing 38 supports a pusher back (not shown), a knife (not shown), and a staple cartridge 38a (FIG. 1) that supports one or more annular arrays of staples (not shown). Details of the components of the cartridge assembly 16 are also provided in the '106 Patent.

[0042] Referring also to FIG. 3, the anvil assembly 18 is supported on the distal end of an approximation mechanism (not shown in its entirety) that includes the rotation knob 26, an anvil retainer (not shown) and the drive screw 40 (FIG. 3). The rotation knob 26 is operably coupled to a proximal end of the drive screw 40 and the anvil retainer (not shown) is coupled to a distal end of the drive screw 40 such that actuation of the rotation knob 26 retracts and advances the drive screw 40 within the stationary handle 22 to move the anvil assembly 18 in relation to the cartridge assembly 16 between the spaced position (FIG. 1) and the approximated position (FIG. 2). A screw stop 50 is fixedly supported on the drive screw 40 and includes an abutment 52 as described in further detail below. Further details of the approximation mechanism are provided in the '106 patent.

[0043] The rotation knob 26 is manually rotated to approximate the anvil assembly 18 and the cartridge assembly 16. More specifically, when the rotation knob 26 is manually rotated in a first direction, the drive screw 40 is moved proximally within the stationary handle 22 from an advanced position towards a retracted position. As discussed above, the lockout mechanism 30 prevents actuation of the firing trigger 24 through an actuation stroke until the anvil assembly 18 is closely approximated with the cartridge assembly 16 to within the firing zone. After the cartridge assembly 16 and the anvil assembly 18 are approximated to within the firing zone, the tissue gap defined

between the anvil assembly 18 and the cartridge assembly 16 is further adjustable to accommodate tissues of different thicknesses as described in further detail below.

[0044] Referring to FIGS. 3-4, the indicator assembly 28 includes an indicator 60, an indicator cover 62, an indicator plate 64 and a biasing member 66. The indicator cover 62 is positioned over an opening or window 68 defined in an upper surface 22a of the stationary handle 22 and includes a pair of sidewalls 70, a curved upper wall 72 supported on the upper edge of the sidewalls 70 and an open bottom 74. The curved upper wall 72 is positioned above the upper surface 22a of the stationary handle 22 and defines three spaced slots 76a-c that allow for visualization of the indicator 60 within the stationary handle 22 as described in further detail below.

[0045] The indicator 60 has a shape that corresponds to the shape of the indicator cover 62 and is pivotally supported within the window 68 of the stationary handle 22 (FIG. 1) beneath the indicator cover 62 about a pivot member 78. More specifically, the indicator 60 includes a pair of spaced sidewalls 80 and a curved upper wall 82 supported on the top edge of the sidewalls 80. The curved upper wall 82 includes an upper surface 82a (FIG. 3A) that supports indicia 84. In embodiments, the indicia 84 include three colored stripes or bands 84a-c. Alternately, other types of indicia may be used including symbols, letters, and/or numbers. The indicator 60 is pivotally supported within the indicator cover 62 on a pivot member 78. One of the sidewalls 80 of the indicator 60 supports an engagement member 88 (FIG. 3A) that is described in further detail below.

[0046] In embodiments, the indicator plate 64 includes a body 90 having a distal end defining a coupling member 92, a central portion 94 defining a stop surface 94a, and a proximal end including a proximally extending finger 96. The stop surface 94a is positioned to engage the abutment 52 on the screw stop 50 when the drive screw 40 is retracted within the stationary handle 22 to approximate the cartridge and anvil assemblies 16, 18. The indicator plate 64 is slidably supported within the stationary handle 22, e.g., along grooves defined along inner walls of the stationary handle 22. The coupling member 92 defines a vertically extending elongated slot 98 that receives the engagement

member 88 of the indicator 60 and the finger 96 of the indicator plate 64 extends through a bracket 100 defining a cutout 100a defined within the stationary housing 22 to guide movement of the indicator plate 64 between advanced and retracted positions. The biasing member 66, which may be a coil spring, is positioned about the finger 96 between the distal end of the bracket 100 and the proximal end of the central portion 94 of the indicator plate 64 to urge the indicator plate 64 towards the advanced position.

[0047] In use, when the rotation knob 26 (FIG. 1) is rotated to move the drive screw 40 in the direction indicated by arrow “A” in FIG. 3 towards its retracted position to move the anvil assembly 18 towards the cartridge assembly 16, the abutment 52 on the screw stop 50 moves into engagement with the stop member 94a on the indicator plate 64 to pull the indicator plate 64 proximally with the drive screw 40 in the direction indicated by arrow “B” in FIG. 3 against the force of the biasing member 66. As the indicator plate 64 is moved from its advanced position towards its retracted position in the direction indicated by arrow “B”, the coupling member 92 of the indicator plate 64 pulls the engagement member 88 of the indicator 60 to pivot the indicator 60 in the direction indicated by arrow “C” in FIG. 3.

[0048] Referring to FIG. 5, prior to approximation of the cartridge and anvil assemblies 16, 18 into the firing zone, each of the colored bands 84a-c of the indicator 60 is positioned adjacent a respective one of the slots 76a-c of the indicator cover 62. As shown in FIG. 5, when the indicator 60 is in its non-actuated position prior to pivotal movement by the indicator plate 64, the distance between the colored band 84c and the slot 76c is less than the distance between the colored band 84b and the slot 76b, and the distance between the colored band 84b and the slot 76b is less than the distance between the colored band 84a and the slot 76a. As such, when the indicator 60 is pivoted in the direction indicated by arrow “C” in FIG. 3 into the firing zone, the colored band 84c will appear in the slot 76c prior to the colored bands 84b and 84a appearing in slots 76b and 76a. When the colored band 84c appears in the slot 76c, this indicates to a clinician that the anvil head 34 of the

anvil assembly 18 has been approximated in relation to the staple cartridge 38a (FIG. 2) to a maximum gap position in the firing zone. The maximum gap position in the firing zone is the position in which the anvil head 34 and the staple cartridge 38a define the largest tissue gap in the firing zone and is suitable for treating relatively thick tissue.

[0049] When the drive screw 40 is retracted further in the direction indicated by arrow “A” in FIG. 3, the abutment 52 of the screw stop 50 continues to pull the indicator plate 64 proximally against the force of the biasing member 66 to further pivot the indicator 60 in the direction indicated by arrow “C” in FIG. 3. As the indicator 60 continues to pivot, the colored band 84c, which is thicker than bands 84a and 84b, remains visible through slot 76c and the colored band 84b appears in the slot 76b. The colored band 84a, which is thinner than colored band 84b, approaches slot 76a but is not yet visible through slot 76a. When the colored band 84b appears in the slot 76b, this indicates to a clinician that the anvil head 34 of the anvil assembly 18 has been approximated to an intermediate gap position smaller than the maximum gap position in the firing zone. The intermediate gap position in the firing zone is suitable for treating tissue of intermediate thickness.

[0050] When the drive screw 40 is retracted further in the direction indicated by arrow “A” in FIG. 3 to its fully retracted position, the abutment 52 of the screw stop 50 continues to pull the indicator plate 64 proximally against the force of the biasing member 66 to further pivot the indicator 60 in the direction indicated by arrow “C” in FIG. 3. As the indicator continues to pivot, the colored band 84c and 84b which are thicker than band 84a remain visible through slots 76c and 76b and the colored band 84a appears in the slot 76a. When the colored band 84a appears in the slot 76a, this indicates to a clinician that the anvil head 34 of the anvil assembly 18 has been approximated to a minimum gap position smaller than the intermediate tissue gap in the firing zone. The minimum gap position in the firing zone is suitable for treating tissue of relatively small thicknesses.

[0051] As discussed above, the colored bands 84a-c may have different thicknesses. More specifically, to ensure that the colored band 84c remains visible under slot 76c and that the colored

band 84b remains visible under slot 76b as the indicator 60 is pivoted through the firing zone, the colored band 84c may have a thickness greater than colored bands 84b and 84a, and the colored band 84b may have a thickness greater than the thickness of colored band 84a.

[0052] FIGS. 9-12 illustrate another embodiment of the presently disclosed visual indicator assembly shown generally as 128. Indicator assembly 128 is substantially the same as indicator assembly 28 except that the configuration of the slots 176a-c and the configuration of the indicia 84 has been changed. More specifically, the indicator cover 162 of the indicator assembly 128 includes slots 176a-c that are longitudinally and laterally offset from each other and the indicator 160 includes a single stepped colored band 184 having three steps 184a-c. Each of the steps 184a-c of the colored band 184 is laterally aligned with a respective one of the slots 176a-c.

[0053] As shown in FIGS. 9 and 10, the distance between the step 184c of the colored band 184 and the slot 176c is less than the distance between the step 184b of the colored band 184 and the slot 176b and the distance between the step 184b and the colored band 184 and the slot 176b is less than the distance between the step 184a of the colored band 184 and the slot 176a. As such, when the indicator 60 is pivoted in the direction indicated by arrow "C" in FIG. 3 into the firing zone, the step 184c of the colored band 184 will appear in the slot 176c prior to the steps 184b and 184a of colored bands 184 appearing in slots 176b and 176a, respectively. Similarly, the step 184b of the colored band 184 will appear in the slot 176b prior to the step 184a of colored band 184 appearing in slot 176a.

[0054] Operation of the indicator assembly 128 is substantially as described above in regard to indicator assembly 28. As such, no further description of the indicator assembly 128 is provided herein.

[0055] Persons skilled in the art will understand that the devices and methods specifically described herein and illustrated in the accompanying drawings are non-limiting exemplary

embodiments. It is envisioned that the elements and features illustrated or described in connection with one exemplary embodiment may be combined with the elements and features of another without departing from the scope of the present disclosure. As well, one skilled in the art will appreciate further features and advantages of the disclosure based on the above-described embodiments. Accordingly, the disclosure is not to be limited by what has been particularly shown and described, except as indicated by the appended claims.

WHAT IS CLAIMED IS:

1. A surgical stapling device comprising:
 - a handle assembly including a stationary handle and a firing trigger, the stationary handle defining a window;
 - a central body extending distally from the handle assembly;
 - a cartridge assembly supported on a distal end of the central body;
 - an anvil assembly;
 - an approximation mechanism including a longitudinally movable drive screw, the drive screw being operatively connected to the anvil assembly such that longitudinal movement of the drive screw between advanced and retracted positions effects movement of the anvil assembly in relation to the cartridge assembly between spaced and approximated positions, the drive screw supporting an abutment; and
 - a visual indicator mechanism including an indicator cover, an indicator and an indicator plate, the indicator cover being supported on the stationary handle above the window and defining a plurality of spaced slots, the indicator being positioned beneath the indicator cover adjacent the window, the indicator supporting indicia, and the indicator plate movable from an advanced position to a retracted position within the stationary handle, the indicator plate supporting a stop member and having a distal end connected to the indicator, wherein the stop member is positioned to engage the abutment such that movement of the drive screw between the advanced and retracted positions effects movement of the indicator within the indicator cover between first and second positions, wherein the indicia are dimensioned and configured such that movement of the indicator within the indicator cover as the indicator plate is moved from the advanced position to the retracted position causes the indicia to become sequentially visible within the plurality of slots.

2. The surgical stapling device according to claim 1, further including a biasing member supported within the stationary handle and positioned to urge the indicator plate towards the advanced position.

3. The surgical stapling device according to claim 1, wherein the indicia include a plurality of spaced colored bands.

4. The surgical stapling device according to claim 3, wherein the plurality of slots includes first, second and third slots, and the plurality of spaced colored bands includes first, second, and third colored bands.

5. The surgical stapling device according to claim 4, wherein when the indicator is in the first position, the first colored band is spaced from the first slot a first distance, the second colored band is spaced from the second slot a second distance, and the third colored band is spaced from the third slot a third distance, the first distance being greater than the first and second distances and the second distance being greater than the third distance.

6. The surgical stapling device according to claim 5, wherein the first colored band has a first width, the second colored band has a second width and the third colored band has a third width, the first width being less than the second and third widths and the second width being less than the third width.

7. The surgical stapling device according to claim 1, wherein the indicator is pivotally supported beneath the indicator cover within the stationary handle.

8. The surgical stapling device according to claim 1, wherein the indicator plate includes a coupling member defining an elongated slot and the indicator includes an engagement member, the engagement member received within the elongated slot to couple the indicator to the indicator plate.

9. The surgical stapling device according to claim 1, wherein the indicator plate includes a proximally extending portion and the stationary handle includes a bracket defining a cutout, the proximally extending portion extending through the cutout to guide movement of the indicator plate within the stationary handle.

10. The surgical stapling device according to claim 9, wherein the biasing member is positioned in compression about the proximally extending portion between the bracket and a central portion of the indicator plate to urge the indicator plate in a distal direction.

11. The surgical stapling device according to claim 1, wherein the indicia include a stepped colored band.

12. The surgical stapling device according to claim 11, wherein the plurality of slots are laterally and longitudinally spaced from each other.

13. The surgical stapling device according to claim 12, wherein the plurality of slots includes first, second and third slots and the stepped colored band includes first, second, and third steps.

14. The surgical stapling device according to claim 13, wherein when the indicator is in the first position, the first step of the colored band is spaced from the first slot a first distance, the second step of the colored band is spaced from the second slot a second distance, and the third step of the colored band is spaced from the third slot a third distance, the first distance being greater than the first and second distances and the second distance being greater than the third distance.

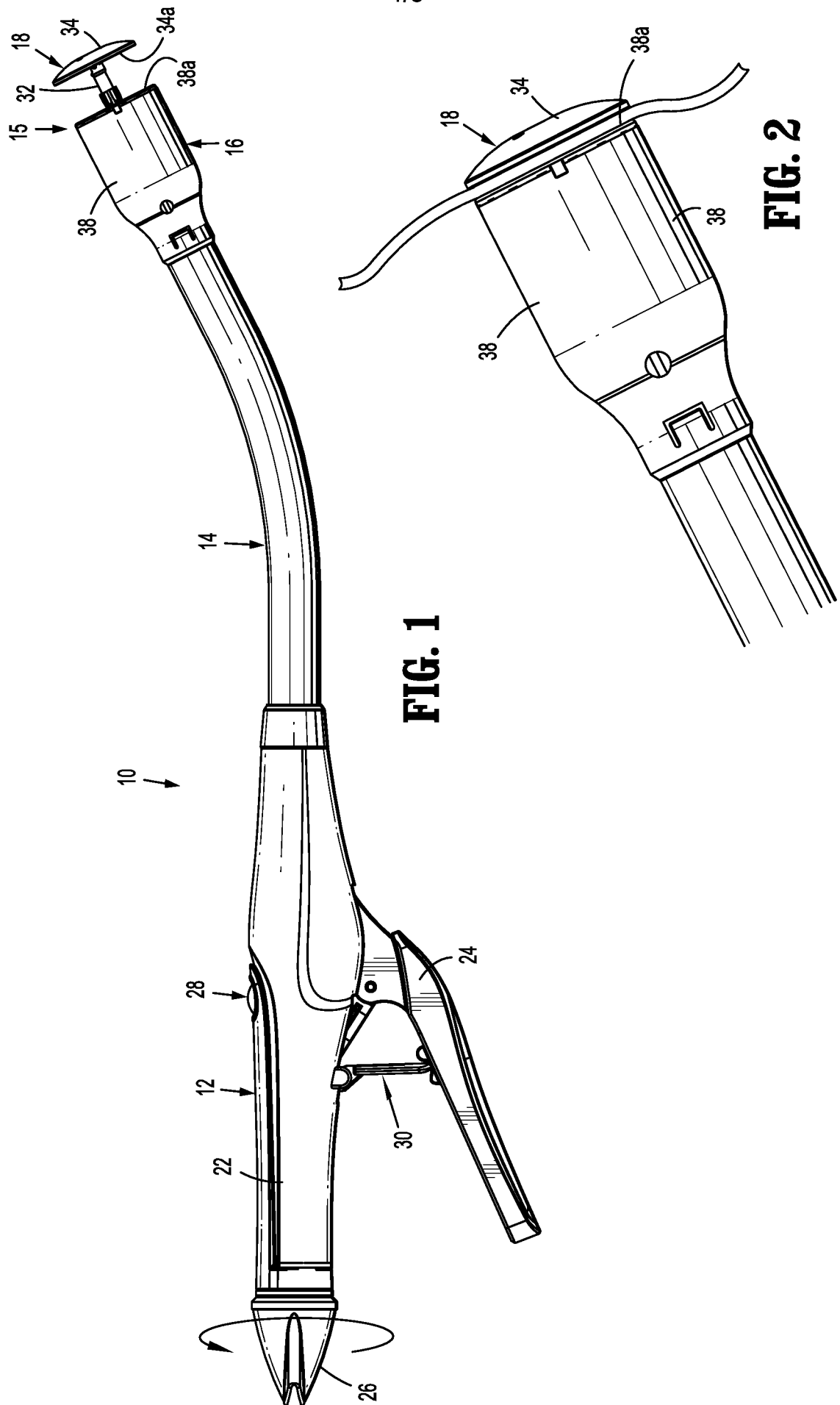


FIG. 2

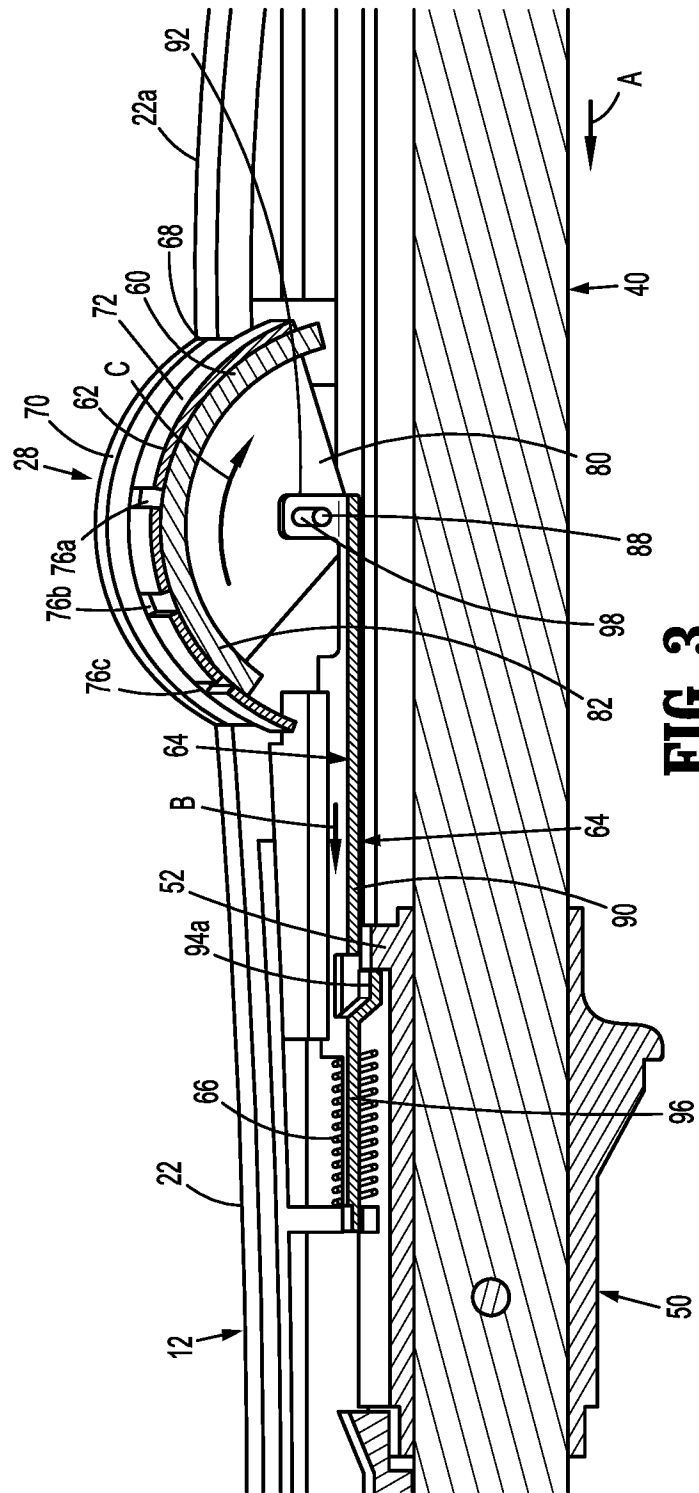


FIG. 3

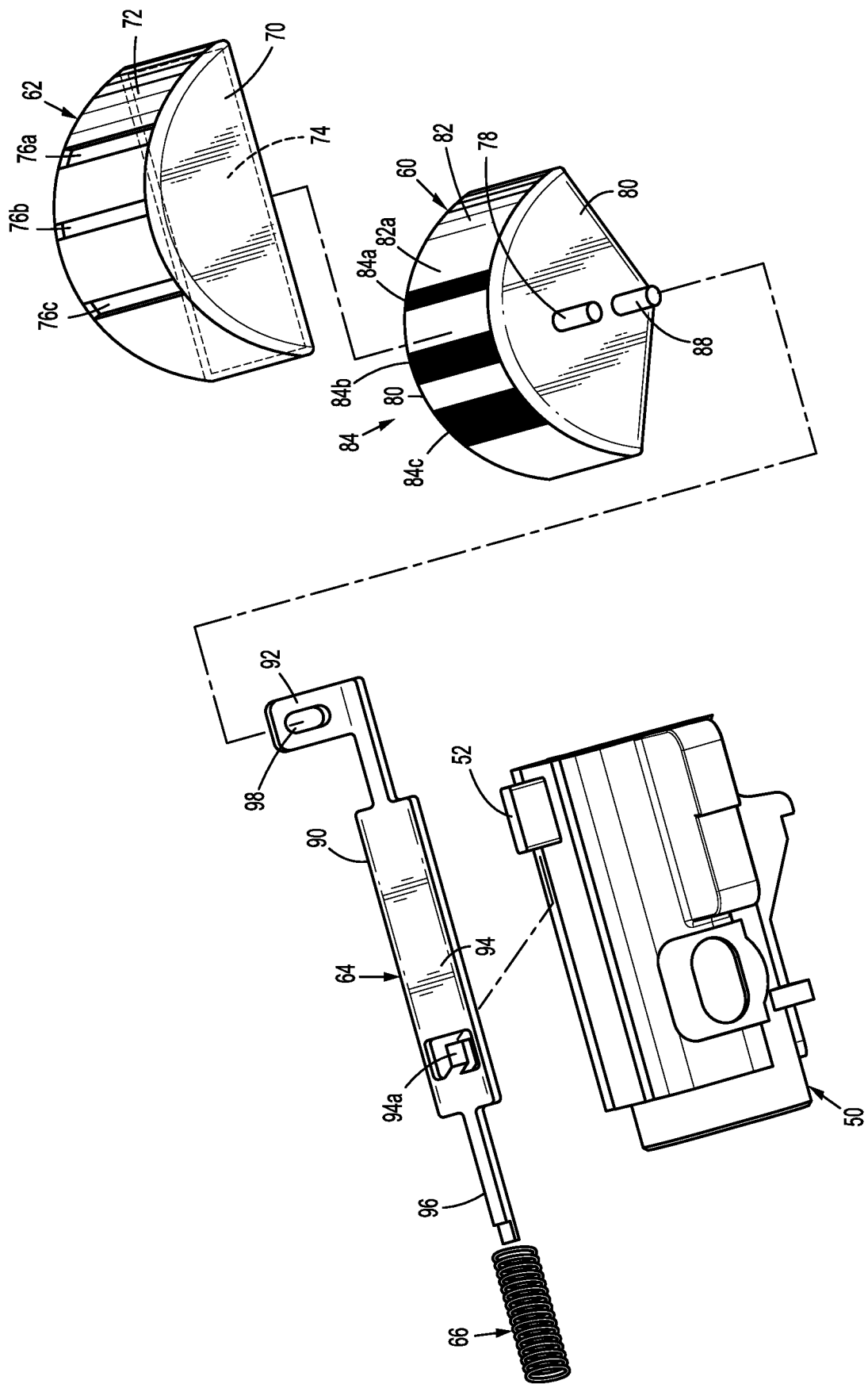


FIG. 3A

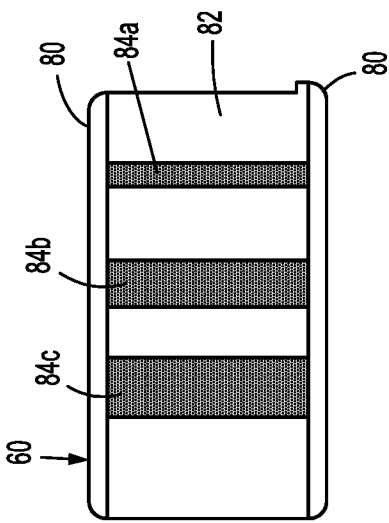


FIG. 4

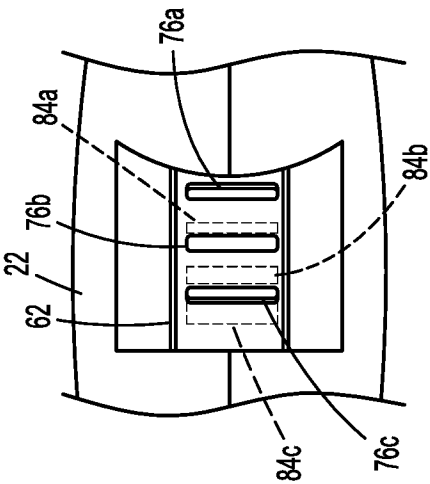


FIG. 5

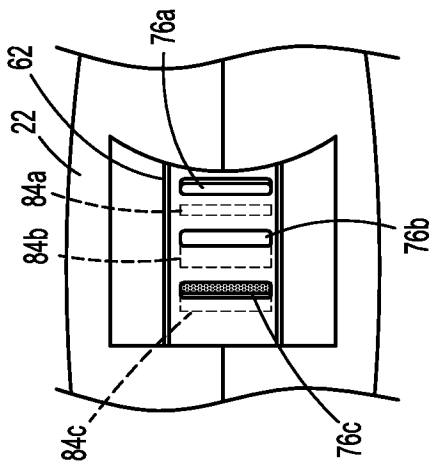


FIG. 6

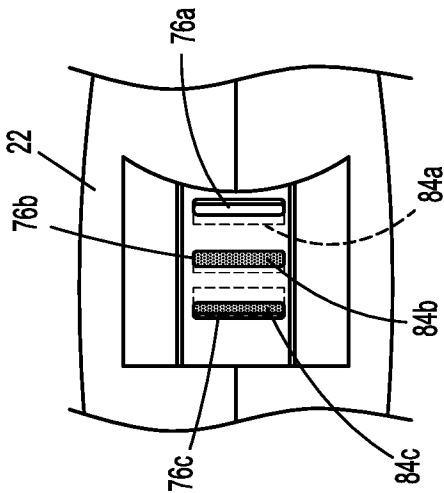


FIG. 7

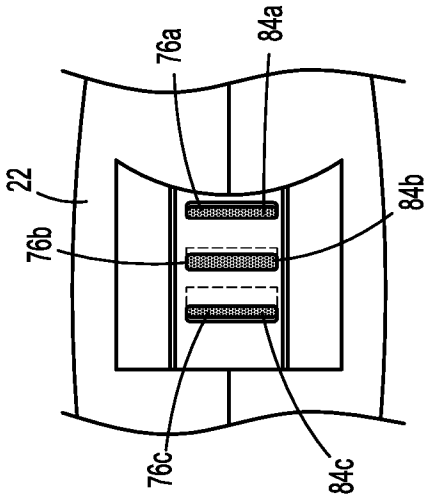


FIG. 8

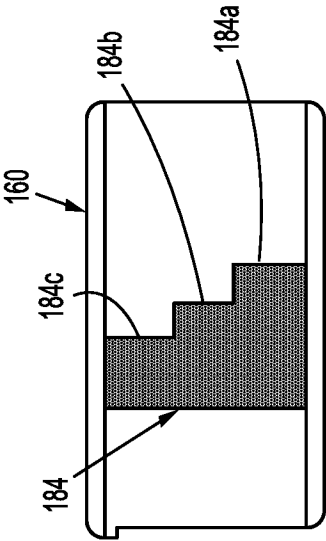


FIG. 9

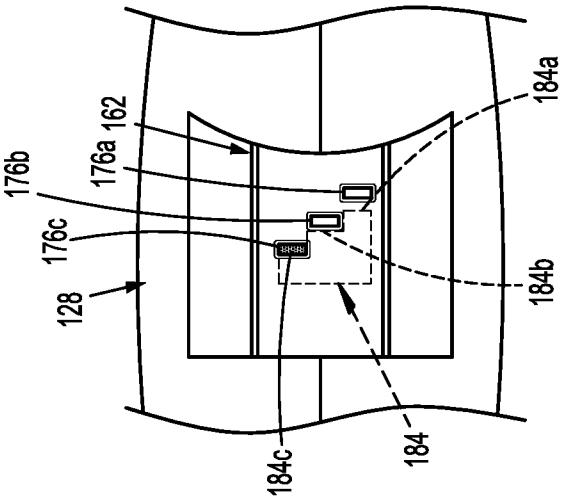


FIG. 10

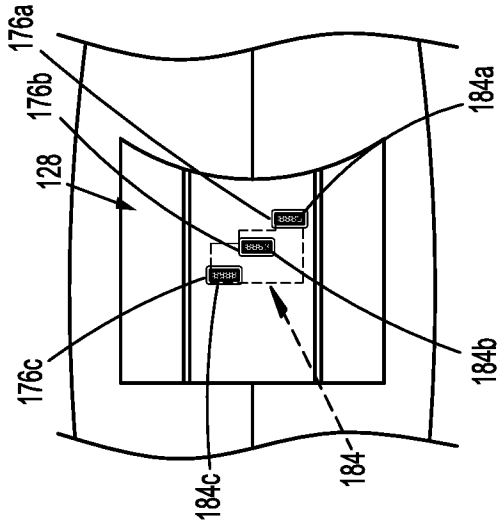


FIG. 11

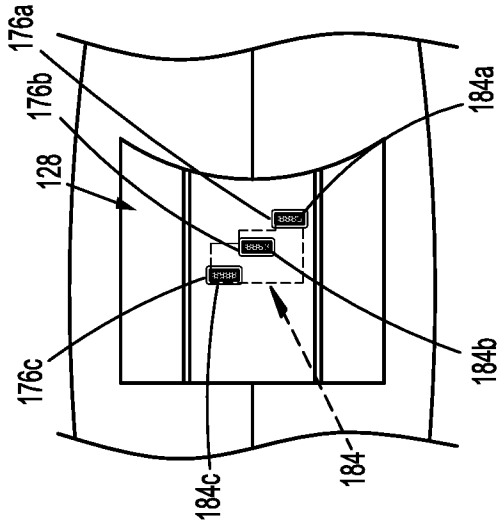


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/073471

A. CLASSIFICATION OF SUBJECT MATTER

A61B 17/115(2006.01)i; A61B 17/068(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61B17/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNKI,CNPAT,WPI,EPODOC: STAPL+, INDICAT+, INDICIA, ANVIL, CARTRIDGE, SLOT?, POSITION+, DISTANCE, THICK+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104039244 A (ETHICON ENDO-SURGERY INC.) 10 September 2014 (2014-09-10) description, paragraphs [0049]-[0057], [0076]-[0080], and figures 1-6	1-14
A	CN 104042288 A (COVIDIEN LP) 17 September 2014 (2014-09-17) the whole document	1-14
A	CN 1973782 A (ZHANG, ZUREN) 06 June 2007 (2007-06-06) the whole document	1-14
A	US 4527724 A (SENMED INC.) 09 July 1985 (1985-07-09) the whole document	1-14
A	CN 102688078 A (B.J.ZH.F. PANTHER MEDICAL EQUIPMENT CO., LTD.) 26 September 2012 (2012-09-26) the whole document	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

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“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

07 September 2016

Date of mailing of the international search report

27 September 2016

Name and mailing address of the ISA/CN

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Telephone No. (86-10)61648419

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2016/073471

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