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(54) **SURGICAL STAPLER HAVING LOCKING ARTICULATION JOINT**

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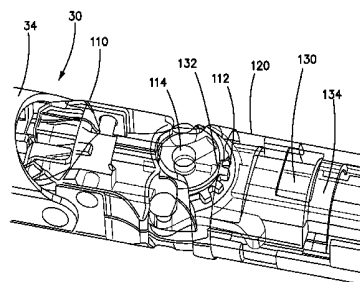
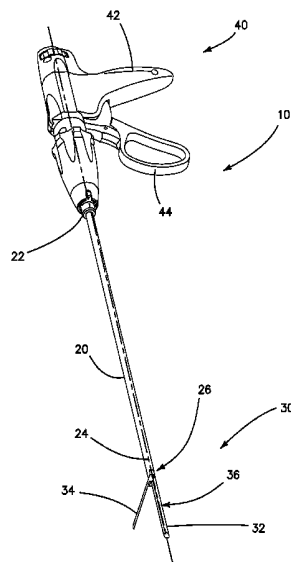
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(57)

ABSTRACT

A laparoscopic surgical stapler can include an articulation joint between an elongate shaft and a jaw assembly. The articulation joint can include a latch mechanism allowing a user to selectively allow the jaw assembly to be freely pivotable with respect to the elongate shaft in an unlatched configuration and positionable in an aligned position or one of several predetermined articulated positions in a latched configuration. The latch mechanism of the articulation joint is biased to the latched configuration and is operable in a 'push-to-release' manner.

14 Claims, 6 Drawing Sheets



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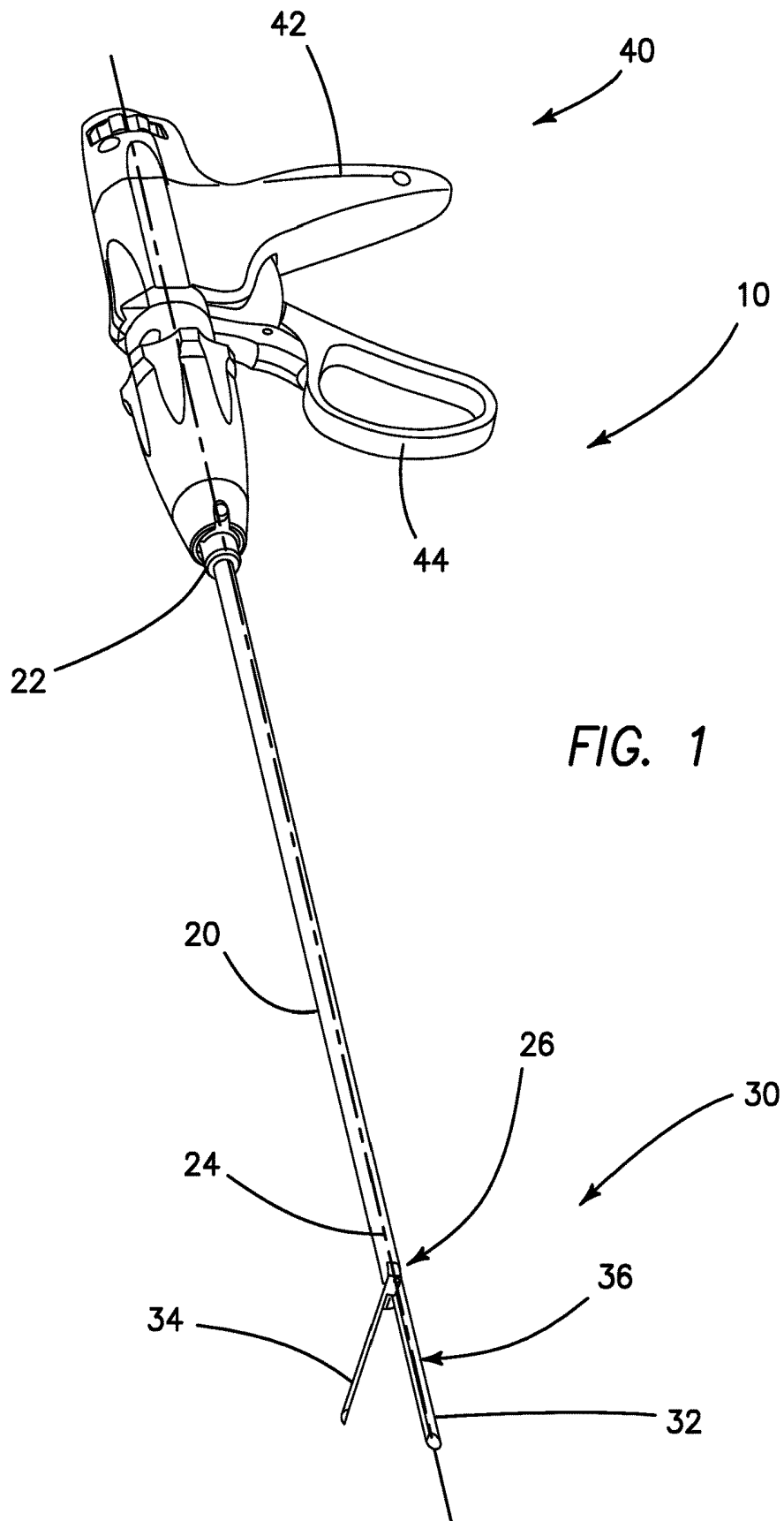
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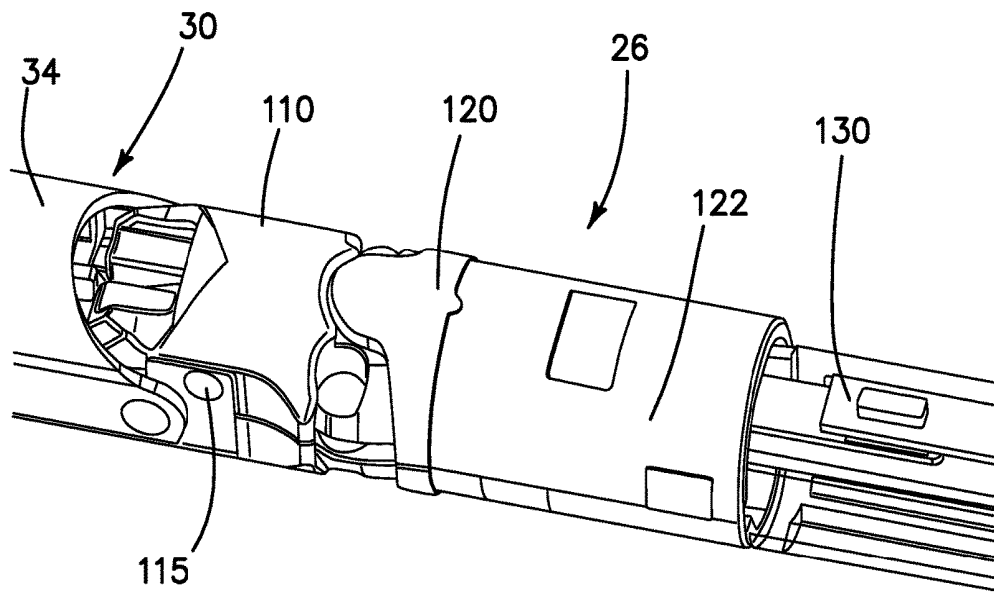


FIG. 2

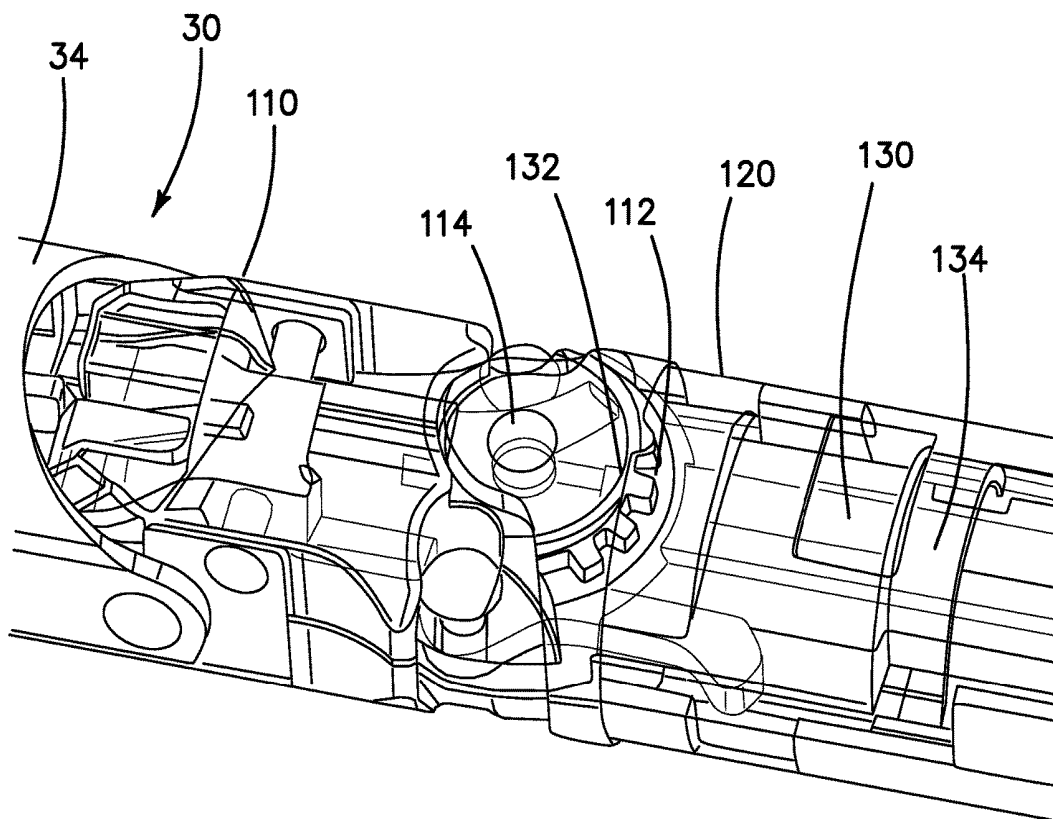
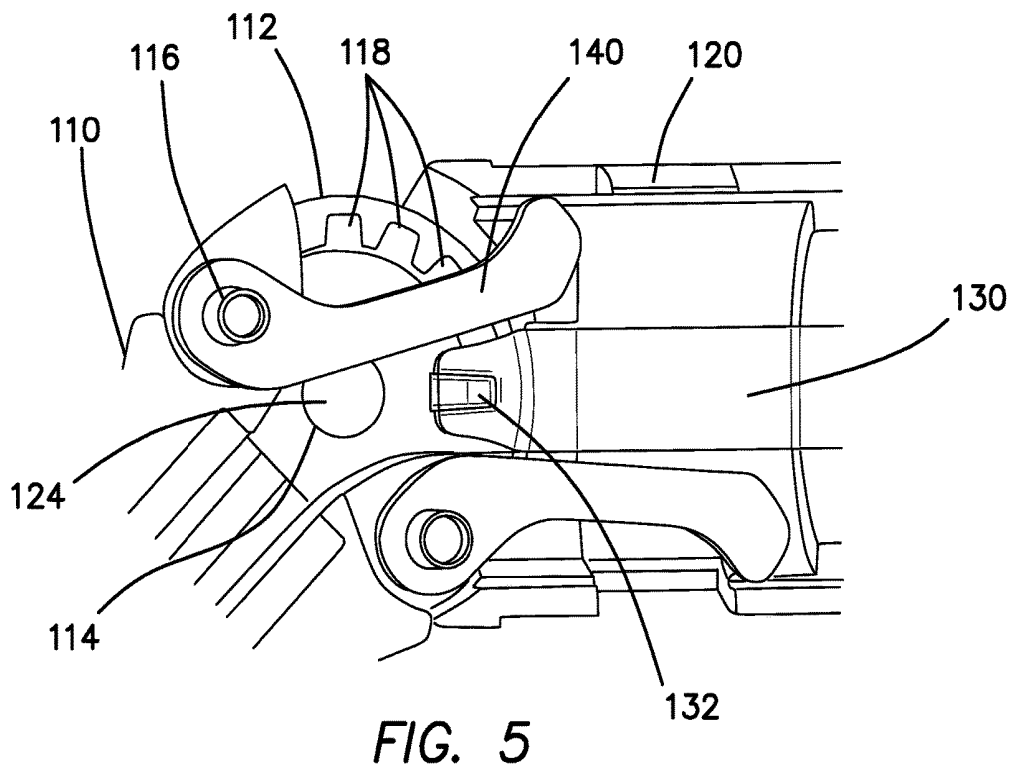
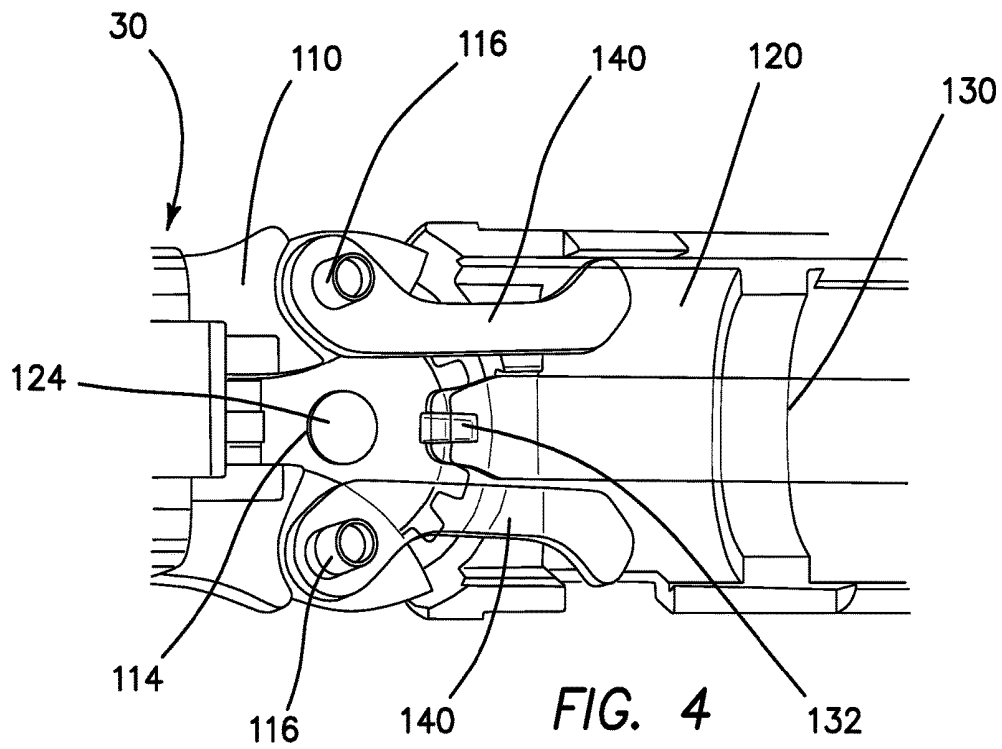
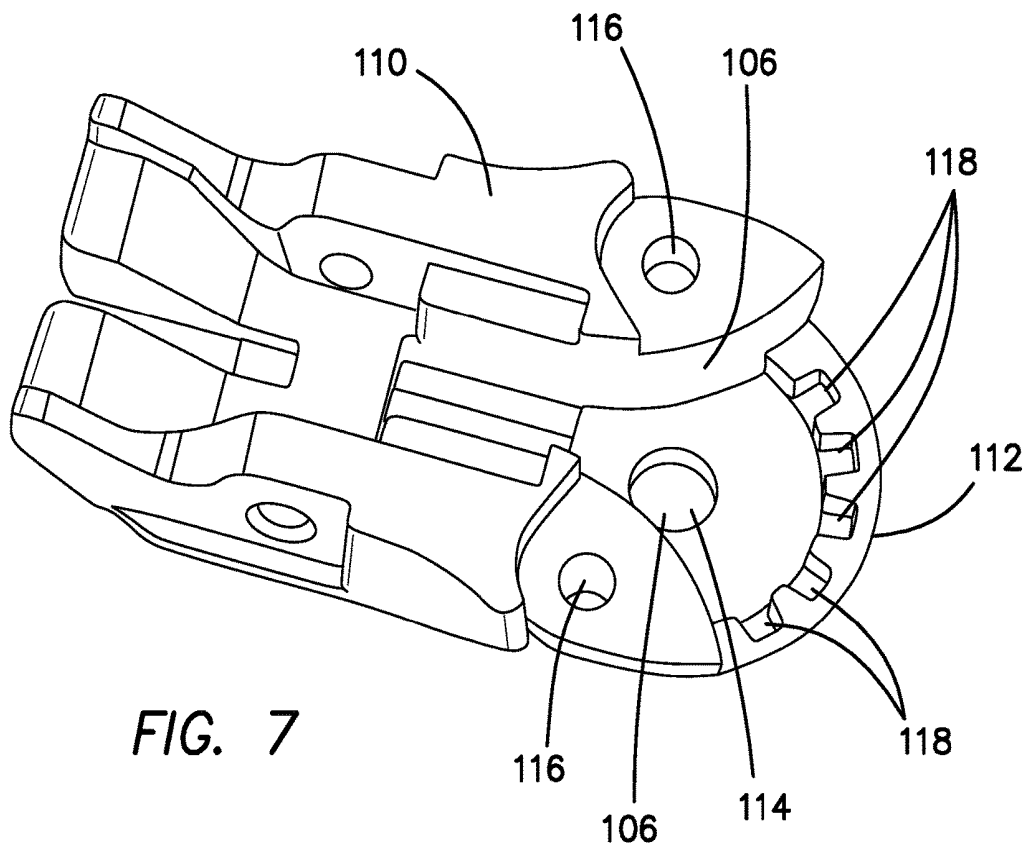
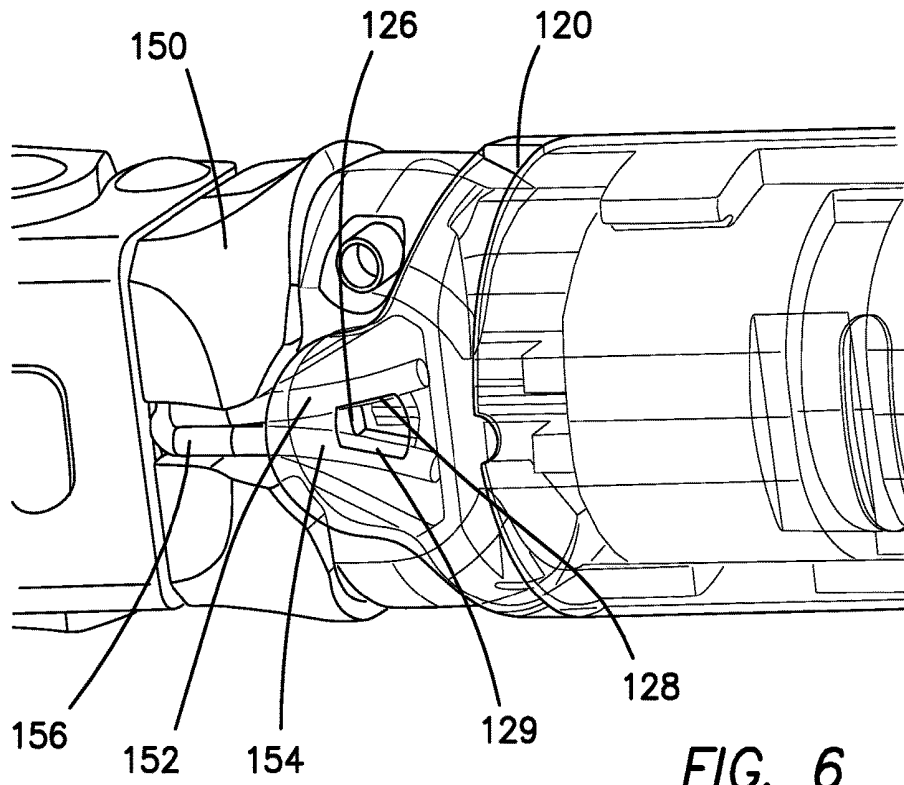
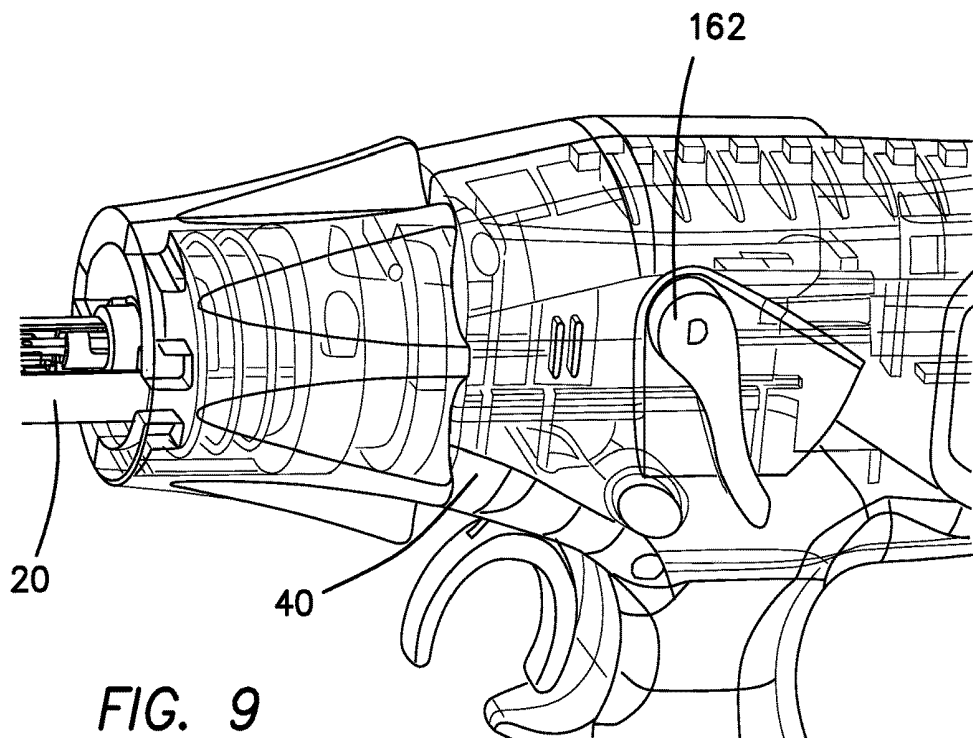
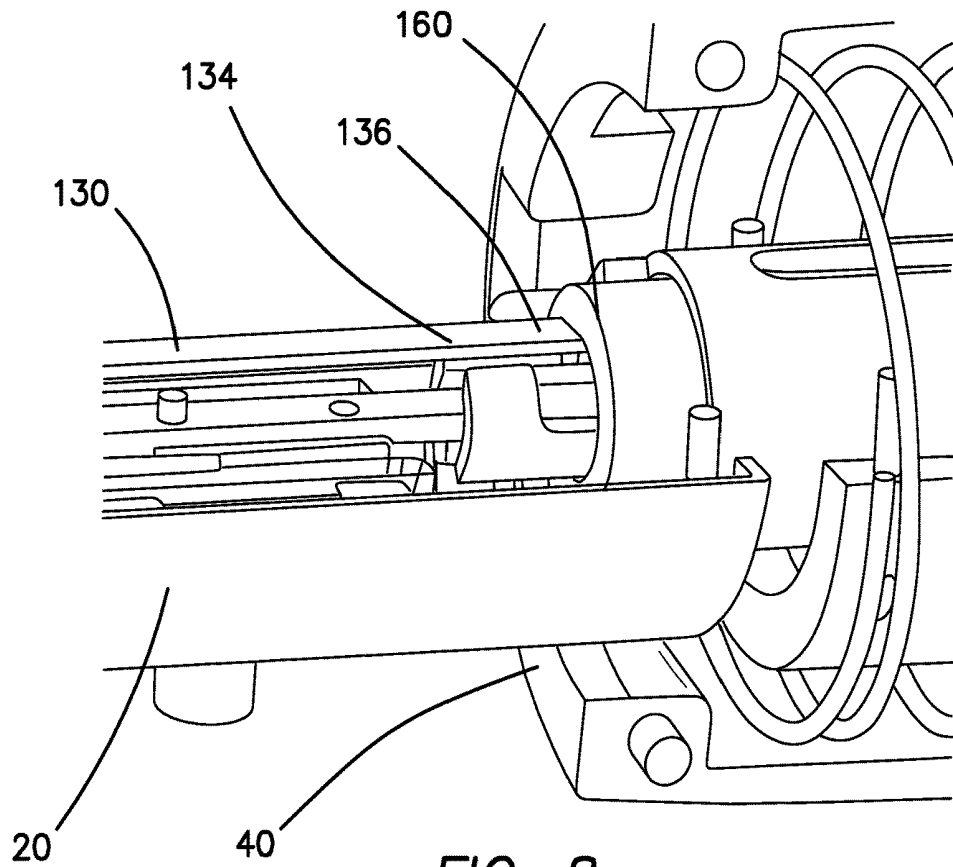
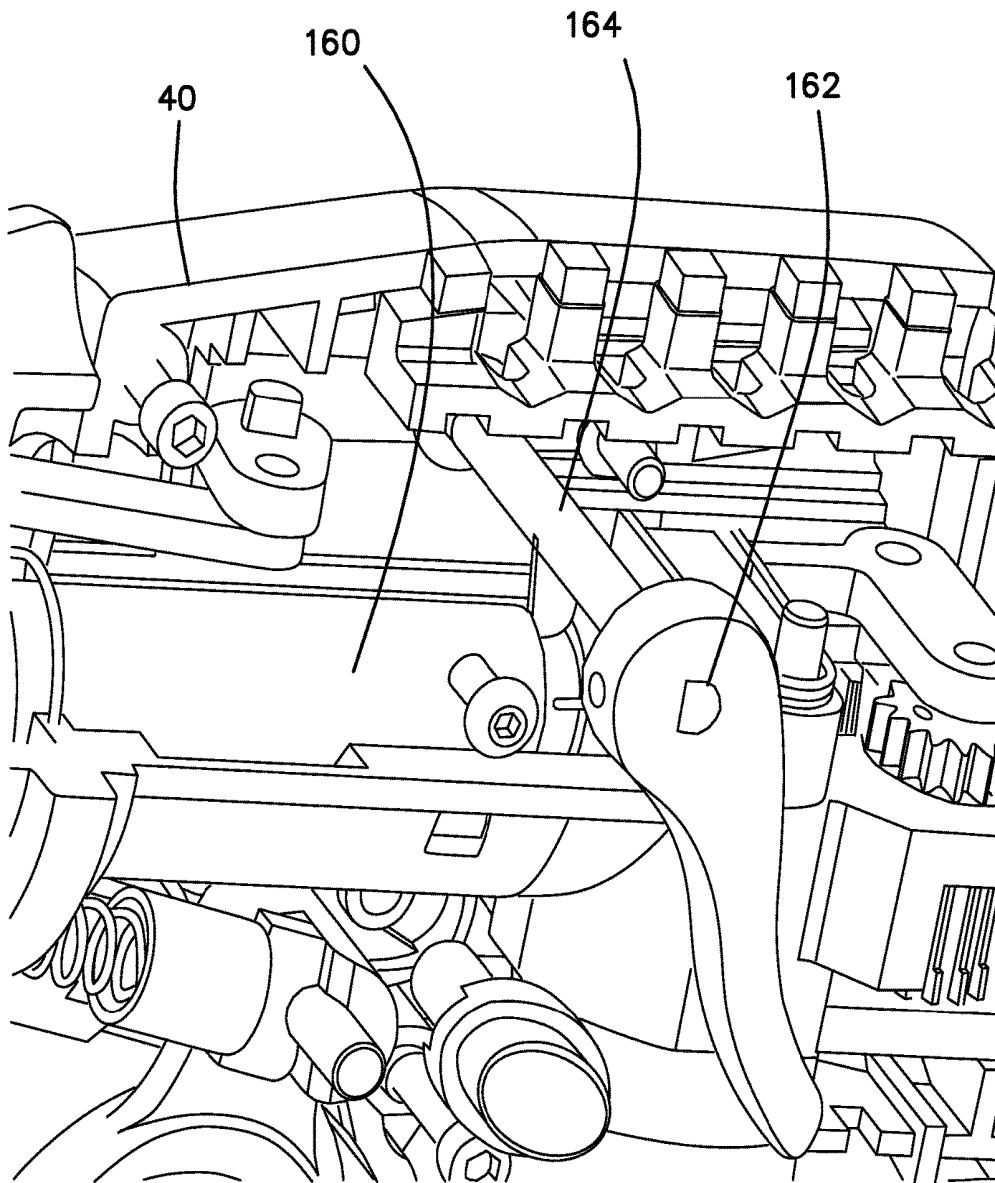


FIG. 3







**FIG. 10**

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SURGICAL STAPLER HAVING LOCKING ARTICULATION JOINT

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application Ser. No. 62/201,995, entitled "SURGICAL STAPLER HAVING LOCKING ARTICULATION JOINT," filed Aug. 6, 2015. The above-referenced application is incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

The present application relates generally to surgical occlusion instruments and, more particularly, to surgical staplers.

Description of the Related Art

Surgical staplers are used to approximate or clamp tissue and to staple the clamped tissue together. Laparoscopic surgical staplers can have a stapler jaw assembly disposed at a distal end of an elongate shaft. The stapler jaw assembly can be introduced to a surgical site through a trocar cannula or other surgical access port. It can be desirable to articulate the stapler jaw assembly relative to the elongate shaft to enhance access to the surgical site. Laparoscopic surgical staplers have had various mechanical and electro-mechanical articulation systems that can allow a user to control an articulated position of the jaw assembly at the distal end of the stapler from a control at the proximal end of the stapler. However, these mechanisms can undesirably add complexity to the handle assembly and jaw assembly of the staplers. With these complex mechanisms, surgical staplers can have increased manufacturing burdens, as well as potential sources for device failure and confusion for the user. Thus, reliable articulation of the jaw assembly of a surgical stapler stapling of clamped tissue without complex mechanisms is desired.

SUMMARY OF THE INVENTION

In certain embodiments, a surgical stapler is described. The surgical stapler comprises an elongate shaft, a jaw assembly, an articulation joint, and a handle assembly. The elongate shaft has a proximal end and a distal end with a longitudinal axis being defined between the proximal end and the distal end. The jaw assembly is positioned at the distal end of the elongate shaft. The jaw assembly comprises a first jaw; and a second jaw. The jaw assembly has an elongate configuration defining a jaw axis. The articulation joint couples the elongate shaft to the jaw assembly. The articulation joint has an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft. The handle assembly is positioned at the proximal end of the elongate shaft. The handle assembly comprises an articulation latch lever. The articulation latch lever is movable between a proximal, latched position in which the articulation joint is in the latched configuration and a distal, unlatched position in which the articulation joint is in the unlatched configuration.

In certain embodiments, a surgical stapler is described. The surgical stapler comprises an elongate shaft, a jaw assembly, an articulation joint, and a handle assembly. The

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elongate shaft has a proximal end and a distal end and a longitudinal axis is defined between the proximal end and the distal end. The jaw assembly is positioned at the distal end of the elongate shaft. The jaw assembly comprises a first jaw and a second jaw. The jaw assembly has an elongate configuration defining a jaw axis. The articulation joint couples the elongate shaft to the jaw assembly. The articulation joint has an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft. The articulation joint comprises a pivot pin and an alignment spring. The pivot pin pivotally couples the jaw assembly to the elongate shaft. The pivot pin has a wedge profile. The alignment spring spans the wedge profile of the pivot pin. The alignment spring biases the jaw axis into alignment with the longitudinal axis. The handle assembly is positioned at the proximal end of the elongate shaft.

In certain embodiments, a surgical stapler is described. The surgical stapler comprises an elongate shaft, a jaw assembly, and an articulation joint. The elongate shaft extends from a proximal end to a distal end along a longitudinal axis. The jaw assembly is positioned at the distal end of the elongate shaft. The jaw assembly comprises a first jaw and a second jaw. The jaw assembly has an elongate configuration defining a jaw axis. The articulation joint couples the elongate shaft to the jaw assembly. The articulation joint has an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft. The articulation joint comprises a support member, a pivot member, and a latch member. The support member comprises a central pivot aperture and a plurality of latch recesses. The pivot member is pivotably coupled to the support member at the central pivot aperture. The latch member is slidable between a proximal position in engagement with one of the latch recesses corresponding to the latched configuration of the articulation joint and a distal position out of engagement with the plurality of latch recesses corresponding to the unlatched configuration of the articulation joint.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an embodiment of surgical stapling device with the jaws in an open configuration;

FIG. 2 is a perspective view of an embodiment of an articulation joint for a surgical stapler;

FIG. 3 is a perspective view of the articulation joint of FIG. 2 with portions of the a support member and pivot member depicted as transparent to illustrate a latch mechanism therein;

FIG. 4 is a cut away view of the articulation joint of FIG. 2 with the jaw assembly in an aligned orientation;

FIG. 5 is a cut away view of the articulation joint of FIG. 2 with the jaw assembly in an articulated orientation;

FIG. 6 is a perspective view of a lower surface of the articulation joint of FIG. 2 with portions of the lower housing depicted as transparent to illustrate the mechanism therein;

FIG. 7 is a perspective view of a support member of the articulation joint of FIG. 2;

FIG. 8 is a partial cut-away view of a connection between an elongate shaft and a handle assembly of a surgical stapler;

FIG. 9 is a perspective view of the handle assembly of FIG. 7 with the a handle housing depicted as transparent to illustrate the mechanism therein; and

FIG. 10 is a cut away view of the handle assembly of FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIG. 1, an embodiment of surgical stapling device is illustrated. The illustrated embodiment of surgical stapler 10 comprises an elongate shaft 20, a jaw assembly 30, and a handle assembly 40. FIG. 1 illustrates the surgical stapler 10 with the jaw assembly 30 in an open configuration.

With continued reference to FIG. 1, the illustrated embodiment of surgical stapler 10 can be sized and configured for use in laparoscopic surgical procedures. For example, the elongate shaft 20 and jaw assembly 30 can be sized and configured to be introduced into a surgical field through an access port or trocar cannula. In some embodiments, the elongate shaft 20 and jaw assembly 30 can be sized and configured to be inserted through a trocar cannula having a relatively small working channel diameter, such as, for example, less than 8 mm. In other embodiments, elongate shaft 20 and jaw assembly 30 can be sized and configured to be inserted through a trocar cannula having a larger working channel diameter, such as, for example, 10 mm, 11 mm, 12 mm, or 15 mm. In other embodiments, it is contemplated that certain aspects of the surgical staplers described herein can be incorporated into a surgical stapling device for use in open surgical procedures.

With continued reference to FIG. 1, as illustrated, the elongate shaft 20 comprises a generally tubular member. The elongate shaft 20 extends from a proximal end 22 to a distal end 24. The elongate shaft 20 defines a central longitudinal axis, L, of the surgical stapler 10 extending between the proximal end 22 and the distal end 24.

With continued reference to FIG. 1, in the illustrated embodiment, the jaw assembly 30 is coupled to the elongate shaft 20 at the distal end 24 of the elongate shaft 20. An articulation joint 26 can join the jaw assembly 30 to the elongate shaft 20. The jaw assembly 30 comprises a first jaw 32 and a second jaw 34 pivotally coupled to the first jaw 32. In the illustrated embodiment, the first jaw 32 is fixed to the articulation joint 26 at the distal end 24 of elongate shaft 20 such that in an aligned orientation, it extends distally along the central longitudinal axis, L. The jaw assembly extends from a proximal end, which is coupled to the articulation joint 26 along a jaw axis to a distal end. The articulation joint 26 can allow the jaw assembly 30 to be positioned in an aligned orientation (FIG. 1) in which the jaw axis is aligned with the central longitudinal axis, or can allow the jaw assembly 30 to be selectively positioned in one of a plurality of articulated positions in which the jaw axis is transverse to the central longitudinal axis. In an initial configuration, the first jaw 32 includes a plurality of staples 36 disposed therein, such as within a reload assembly or cartridge.

With continued reference to FIG. 1, in the illustrated embodiment, the jaw assembly 30 can be actuated from an open configuration (FIG. 1) to a closed configuration to a stapling configuration by an actuation member or beam that is longitudinally slidable within the elongate shaft. In an initial position, the beam can be positioned at the distal end 24 of the elongate shaft 20. With the beam in the initial position, the second jaw 34 is pivoted away from the first jaw 32 such that the jaw assembly 30 is in the open

configuration. The actuation beam engages the second jaw 34 upon translation of the actuation member or beam distally along the longitudinal axis L. Translation of the actuation beam distally from the initial position a first distance can actuate the jaw assembly from the open configuration to the closed configuration. With the jaw assembly 30 in the closed configuration, the actuation beam can be returned proximally the first distance to return the jaw assembly 30 to the open configuration. A distal end of the actuation beam can advance a staple slider configured to deploy staples from the first jaw 32 such that further translation of the actuation beam distally past the first distance deploys the plurality of staples 36 from the first jaw 32.

With continued reference to FIG. 1, in the illustrated embodiment, the handle assembly is coupled to the elongate shaft 20 at the proximal end 22 of the elongate shaft 20. As illustrated, the handle assembly 40 has a pistol grip configuration with a housing defining a stationary handle 42 and a movable handle 44 or trigger pivotally coupled to the stationary handle 42. It is contemplated that in other embodiments, surgical stapler devices including aspects described herein can have handle assemblies with other configuration such as, for example, scissors-grip configurations, or in-line configurations. The handle assembly 40 can include a mechanical or electromechanical actuation assembly that moves the actuation beam responsive to movement of the stationary handle 42 or trigger.

In some embodiments, the surgical stapler 10 can include the plurality of staples 36 positioned in a disposable cartridge while the handle assembly 40 is configured to be reused with multiple staple cartridges. In the illustrated embodiment, the elongate shaft 20 and jaw assembly 30 define a disposable cartridge that is removably couplable to the handle assembly 40. Accordingly, in the illustrated embodiment the handle assembly 40 includes a coupler 46 at the distal end thereof. The coupler 46 is adapted to engage the elongate shaft 20 of the surgical stapler 10. The coupler 46 can comprise a bayonet connection having an outer connector that can removably couple to handle assembly 42 the elongate shaft 20, and an inner connector that can removably couple the actuation shaft of the handle assembly 42 to the actuation member of the elongate shaft 20. Accordingly, the surgical stapler 10 can be configured such that the handle assembly 40 can be reused with multiple disposable cartridges during a surgical procedure. It is contemplated that in other embodiments, the handle assembly and some portion of the elongate shaft can be reusable while a remainder of the elongate shaft and the jaw assembly define a disposable cartridge. In certain other embodiments, the handle assembly and the elongate shaft can be reusable while the jaw assembly defines a disposable cartridge. In still other embodiments, a jaw insert housing a plurality of staples can define a disposable cartridge while the remainder of the surgical stapler is reusable with multiple disposable cartridges.

With reference to FIGS. 2-3, a perspective view of the articulation joint 26 is illustrated. The articulation joint can comprise a support member 110 pivotally coupled to a pivot member 120. The articulation joint can further comprise a latch member 130 to selectively latch and unlatch the articulation joint 26. The support member 110 can be coupled to the proximal end of the jaw assembly 30, and the pivot member 120 can be coupled to the distal end of the elongate shaft (not illustrated to enhance visualization of the articulation joint). In the illustrated embodiment, the support member 110 is coupled to the jaw assembly at a riveted or pinned connection 115 as further described herein. In some

embodiments, the pivot member **120** can include a coupling sleeve **122** portion that can be slid into the distal end of the elongate shaft.

With reference to FIG. 3, the articulation joint **26** is illustrated with the support member **110** and pivot member **120** illustrated as translucent to enhance visualization of the articulation latching mechanism therein. The support member can comprise a pivot **114**. In the illustrated embodiment, the pivot of the support member comprises an aperture formed therein in which a pin-like protrusion **124** extending radially inward from the pivot member **120** is positioned to allow relative pivotal movement of the support member **110** and pivot member **120** at the pivot **114**. In other embodiments, the support member can comprise a pin-like protrusion formed therein and the pivot member can include a pivot aperture for receiving the protrusion. In still other embodiments, the support member and pivot member can each include a pivot aperture that are pivotally coupled to one another by a separate pin or rivet.

With continued reference to FIG. 3, the support member **110** further comprises a latch **112** at the proximal end thereof. The latch member **130** can extend distally past the proximal end of the support member **110** to selectively engage the latch **112** to pivotally fix the articulation joint **26** in a latched configuration. The latch member **130** extends longitudinally through the elongate shaft of the stapler from a proximal end to a distal end. The latch member **130** can comprise an elongate strip **134** extending through the elongate shaft **20**. The latch member **130** further comprises a protrusion or latching tooth **132** extending from the distal end of the latch member **130**.

The latch member **130** is longitudinally slidable with respect to the central longitudinal axis of the elongate shaft between a distal position and a proximal position. With the latch member **130** slid longitudinally distally to a distal position, the latching tooth **132** can be positioned distally of the latch **112** such that the articulation joint **26** is in an unlatched configuration. In the unlatched configuration, the jaw assembly can be pivoted with respect to the elongate shaft about the pivot **114** responsive to an external force on the jaw assembly **30**. The external force can be applied by, for example, a surface of a surgical site or interaction with another surgical instrument such as the surgical access port or a laparoscopic tool. With the latch member **130** in the proximal position, the latching tooth **132** engages the latch **112** of the support member **110** to pivotally fix the jaw assembly with respect to the elongate shaft. The latch member can desirably be biased to the proximal position such that the articulation joint is biased to the latched configuration. For example, in some embodiments, a biasing member or spring positioned within the elongate shaft can engage the elongate strip **134** to bias the latch member **130** to the proximal position.

With reference to FIGS. 4 and 5, the latch mechanism of the articulation joint is illustrated in an aligned position (FIG. 4) and an articulated position (FIG. 5). In the illustrated embodiment, the latch **112** at the proximal end of the support member **110** comprises a plurality of latch recesses **118** that are arranged in a generally arc-shaped array proximal the pivot **114**. The latch recesses **118** each comprise an open end at a distal end thereof. With the articulation joint in an unlatched configuration, as the jaw assembly and support member **110** coupled thereto are pivoted about the pivot **114** with respect to the elongate shaft and pivot member **120**, one of the plurality of latch recesses **118** aligns with the tooth **132** of the latch member to define a corresponding latch position of the articulation joint. In the

illustrated embodiment, the latch **112** comprises five latch recesses **118** such that the articulation joint is pivotable between an aligned position and four articulated positions in which the jaw axis is transverse to the central longitudinal axis. In other embodiments, the latch **112** can have more or fewer than five latch recesses to define a corresponding number of latch positions. Each of the latch recesses **118** can have a radiused or tapered 'lead in' to facilitate engagement of the tooth **132** of the latch member **130** with one of the plurality of latch recesses **118** in the event of slight misalignment between the latch recess **118** and the latch member **130**.

With continued reference to FIGS. 4 and 5, the articulation joint can be configured to allow a flexible staple actuation or drive member to pass therethrough and minimize buckling of the flexible actuation member when the articulated joint is in an articulated position. For example, the support member can comprise a pair of support link pivots **116** laterally offset from the pivot **114** and a corresponding pair of support links **140** coupled to the support link pivots **116**. Each support link of the pair of support links **140** can be pivotally coupled to a corresponding one of the support link pivots and extend generally proximally into the pivot member **120** towards the elongate shaft. The support links **140** define a channel therebetween in which the flexible actuation member can extend. As the articulation joint **26** is positioned in an articulated position (FIG. 5), the support links **140** pivot with respect to the support member **110** to maintain the channel for the flexible actuation member. Thus, the support links **140** can provide a substantially continuous channel wall to prevent the flexible actuation member from buckling or bowing at the articulation joint as the actuation member passes through the articulation joint.

Each of the support links **140** can be sized to extend between the support member **110** and the pivot member over a full articulation range of the articulation joint. In the illustrated embodiment, each of the support links **140** include a curved first end pivotally coupled to one of the support link pivots **116**, a curved second end opposite the first end, and a central span extending between the first end and the second end. The curved second ends can extend into sliding contact with the pivot member **120** to further support the flexible actuation member positioned in the channel between the central spans of the support links.

With reference to FIG. 7, a perspective view of the support member **110** is illustrated. The latch **112** including latch recesses **118** are illustrated at the proximal end thereof. The pivot **114**, comprising a pivot aperture, is illustrated at a central position of the support member. The pair of support link pivots **116** are positioned laterally offset from the pivot **114**. In the illustrated embodiment, the support link pivots are each disposed on radiused sidewall surfaces **106** that facilitate a radiused bend for a flexible actuation member extending therethrough when the articulation joint is in an articulated position.

With reference to FIG. 6, a lower view of the articulation joint is illustrated. The pivot member **120** is illustrated as translucent, providing a cut away view to enhance visualization of an embodiment of alignment mechanism of the articulation mechanism. The alignment mechanism can be configured to bias the jaw axis into alignment with the central longitudinal axis of the elongate shaft. In the illustrated embodiment, the articulation mechanism comprises a lower support member **150** that can be coupled with the support member **110** and the jaw assembly. The lower support member **150** is pivotally coupled to the pivot member **120**. In the illustrated embodiment, the pivot mem-

ber 120 has a protruding pivot pin 126 having a wedge profile. The wedge profile is defined by a portion of the pivot pin 126 having a first substantially planar face 128 on a lateral edge thereof and a second substantially planar face 129 opposite the first substantially planar face. In the illustrated embodiment, the first and second substantially planar faces 128, 129 are transverse to one another. A spring 156 can span the pivot pin 126. The spring 156 can have a first leg 152 that is engageable with the first substantially planar surface 128 and a second leg 154 that is engageable with the second substantially planar surface 129. When the jaw assembly is misaligned with the elongate shaft, one leg of the spring engages the corresponding surface of the pivot pin 126 to bias the jaw assembly towards an aligned orientation.

Accordingly, in order to articulate the jaw assembly, a user first releases the latch mechanism to configure the articulation mechanism in an unlatched configuration. Then the user applies a force to the jaw assembly in a desired articulation direction. The applied force can be generated by bearing the jaw assembly against an anatomic feature in the surgical field or against another surgical instrument. In order to articulate the jaw assembly, the applied force overcomes the biasing force applied by the spring 156 of the alignment mechanism. With the stapler in the desired articulated position, the user can engage the latch mechanism to configure the articulation joint in the latched configuration. If it is desired to return the jaw assembly to an aligned configuration, such as, for example to remove the stapler from a surgical port, the user can release the latch mechanism and allow the bias of the alignment mechanism to return the jaw assembly to an aligned orientation.

With reference to FIGS. 8-10 an embodiment of latch release mechanism in the handle assembly 40 is illustrated. The latch release mechanism includes an articulation latch lever 162 in the handle assembly 40 for selectively controlling the articulation joint. FIG. 9 illustrates a thumb control articulation latch lever 162 positioned on a side of a handle assembly 40 to allow single-handed operation of the articulation joint. The handle assembly 40 is removably coupled to the elongate shaft 20. FIG. 8 provides a detailed cut away view of the handle assembly 40 to elongate shaft 20 connection. As illustrated, the elongate strip 134 of the latch member 130 extends through the elongate shaft 20 to the proximal end of the elongate shaft 20. Advantageously, since the latch member 130 is biased proximally and has a 'push-to-release' operation, a proximal end 136 of the elongate strip 134 merely needs to abut a longitudinally advanceable release member, which simplifies connection of the articulation joint to a lever mechanism on the handle assembly. Alternatively, a latch member with 'pull-to-release' operation could require a mating engagement, such as a bayonet connection, with a lever mechanism on the handle assembly.

With reference to FIGS. 8 and 10, operation of the articulation latch lever to push the latch member 130 is illustrated. As illustrated in FIG. 10, the articulation latch lever 162 extends from an end of an axle 164 such that movement of the latch lever 162 rotates the axle about a rotation axis thereof. A link couples the axle to a groove on an articulation sleeve 160. In the illustrated embodiment, the articulation sleeve 160 is a generally tubular member that extends distally to a distal end of the handle 40 (FIG. 8). When the elongate shaft 20 is coupled to the handle, the latch member 130 of the articulation joint abuts the articulation sleeve 160. In operation, when a user advances an end of the articulation latch lever 162 distally, the articulation sleeve 160 is correspondingly advanced distally and the

abutting latch member 130 is pushed distally. The distal end of the latch member 130 is thus disengaged from a latch recess of the articulation joint to allow the jaw assembly to be pivoted responsive to a force external to the jaw assembly.

Advantageously, in the illustrated embodiment with 'push-to-release' interaction of the articulation sleeve 160 and latch member 130, the proximal end of the latch member 130 and distal end of the articulation sleeve 160 can be positioned in contacting or abutting engagement when the elongate shaft is coupled to the handle assembly. The proximal end of the latch member 130 can include a generally planar abutment surface that interfaces with a correspondingly generally planar release surface on the articulation sleeve 160. As illustrated, the articulation sleeve comprises an annular member such that the elongate shaft can be rotated about the longitudinal axis with continuous contact between the abutment surface of the latch member 130 and the release surface of the articulation sleeve. Thus, the elongate shaft can be rotatable about the longitudinal axis with respect to the handle assembly to facilitate desired positioning of the jaw assembly at a surgical site while maintaining the abutted connection of the latch release mechanism. Accordingly, such an arrangement can provide reliable latch release functionality for a handle assembly and removable elongate shaft without requiring relatively complex coupling, interfacing, or interlocking geometries for the articulation mechanism.

Although this application discloses certain preferred embodiments and examples, it will be understood by those skilled in the art that the present inventions extend beyond the specifically disclosed embodiments to other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof. Further, the various features of these inventions can be used alone, or in combination with other features of these inventions other than as expressly described above. For example, it is contemplated that certain aspects of the articulation latch mechanisms and release mechanisms can be incorporated in stapling systems including manual or electrically powered staple deployment. Moreover it is contemplated that certain aspects of the articulation latch mechanisms and release mechanisms can be incorporated in stapling systems including manually selectable articulation mechanisms. Thus, it is intended that the scope of the present inventions herein disclosed should not be limited by the particular disclosed embodiments described above, but should be determined only by a fair reading of claims which follow.

What is claimed is:

1. A surgical stapler comprising:

an elongate shaft having a proximal end and a distal end and defining a longitudinal axis between the proximal end and the distal end;

a jaw assembly positioned at the distal end of the elongate shaft, the jaw assembly comprising:

a first jaw; and

a second jaw;

wherein the jaw assembly has an elongate configuration defining a jaw axis;

an articulation joint coupling the elongate shaft to the jaw assembly, the articulation joint having an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft; and

a handle assembly positioned at the proximal end of the elongate shaft, the handle assembly comprising an articulation latch lever, wherein the articulation latch lever is movable between a proximal, latched position in which the articulation joint is in the latched configuration and a distal, unlatched position in which the articulation joint is in the unlatched configuration; wherein the articulation joint comprises:

- a support member having a central pivot defining a pivot axis of the articulation joint and a plurality of latch recesses; and
- a latch member longitudinally slidable with respect to the longitudinal axis of the shaft, the latch member slidable between a distal position in which the articulation joint is in the unlatched configuration and a proximal position in which the latch member engages one of the plurality of latch recesses such that the articulation joint is in the latched configuration;

wherein the latch member comprises an elongate member extending within the elongate shaft from the proximal end of the elongate shaft to the distal end of the elongate shaft, the elongate member having a proximal end and a distal end, and the latch member further comprising a latching tooth at the distal end of the elongate member, the latching tooth configured to engage one of the plurality of latch recesses, wherein the elongate member is biased proximally to bias the articulation joint to the latched configuration.

2. The surgical stapler of claim 1, wherein the support member has a proximal end and a distal end and the plurality of latch recesses is positioned adjacent the proximal end and wherein the latch member extends across the proximal end of the support member in both the proximal position and the distal position.

3. The surgical stapler of claim 1, wherein the plurality of latch recesses each comprise an open end at a distal end thereof and a closed end at a proximal end thereof and wherein the latch member engages the open end of one of the latch recesses with the articulation joint in the latched configuration.

4. The surgical stapler of claim 1, wherein the plurality of latch recesses is arranged along an arc segment proximal of the central pivot such that each latch recess defines a corresponding latched position of the articulation joint.

5. The surgical stapler of claim 1, wherein the elongate shaft comprises a spring biasing the elongate member proximally.

6. A surgical stapler comprising:

- an elongate shaft having a proximal end and a distal end and defining a longitudinal axis between the proximal end and the distal end;
- a jaw assembly positioned at the distal end of the elongate shaft, the jaw assembly comprising:
 - a first jaw; and
 - a second jaw;
 wherein the jaw assembly has an elongate configuration defining a jaw axis;
- an articulation joint coupling the elongate shaft to the jaw assembly, the articulation joint having an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft, and the articulation joint comprising:
 - a pivot pin pivotally coupling the jaw assembly to the elongate shaft, the pivot pin having a wedge profile; and

- an alignment spring spanning the wedge profile of the pivot pin, the alignment spring biasing the jaw axis into alignment with the longitudinal axis; and
- a handle assembly positioned at the proximal end of the elongate shaft;

wherein the articulation joint comprises:

- a support member comprising:
 - a central pivot aperture;
 - a first support link pivot laterally offset from the central pivot aperture;
 - a second support link pivot laterally offset from the central pivot aperture opposite the first support link pivot; and
 - a plurality of latch recesses;
- a latch member longitudinally slidable with respect to the longitudinal axis between a distal position in which the articulation joint is in the unlatched configuration and a proximal position in which the latch member engages one of the plurality of latch recesses such that the articulation joint is in the latched configuration.

7. The surgical stapler of claim 6, wherein the articulation joint further comprises:

- a first support link extending from the first support link pivot proximally into the elongate shaft; and
- a second support link extending from the second support link pivot proximally into the elongate shaft.

8. The surgical stapler of claim 6, wherein the wedge profile of the pivot pin is defined by a first substantially planar face on a lateral edge thereof and a second substantially planar face opposite the first substantially planar face.

9. The surgical stapler of claim 8, wherein the alignment spring has a first leg abutting the first substantially planar face and a second leg abutting the second substantially planar face.

10. A surgical stapler comprising:

- an elongate shaft extending from a proximal end to a distal end along a longitudinal axis;
- a jaw assembly positioned at the distal end of the elongate shaft, the jaw assembly comprising:
 - a first jaw; and
 - a second jaw;
 wherein the jaw assembly has an elongate configuration defining a jaw axis; and
- an articulation joint coupling the elongate shaft to the jaw assembly, the articulation joint having an unlatched configuration in which the jaw assembly is pivotable with respect to the elongate shaft upon application of an external force to the jaw assembly and a latched configuration in which the jaw assembly is pivotally secured with respect to the elongate shaft, and the articulation joint comprising:
 - a support member comprising:
 - a central pivot aperture; and
 - a plurality of latch recesses
 - a pivot member pivotably coupled to the support member at the central pivot aperture; and
 - a latch member slidable between a proximal position in engagement with one of the latch recesses corresponding to the latched configuration of the articulation joint and a distal position out of engagement with the plurality of latch recesses corresponding to the unlatched configuration of the articulation joint.

11. The surgical stapler of claim 10, wherein the latch member is biased to the proximal position.

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12. The surgical stapler of claim **10**, wherein the latch member extends from a proximal end at the proximal end of the elongate shaft to a distal end at the distal end of the elongate shaft.

13. The surgical stapler of claim **12**, wherein the proximal end of the latch member comprises an abutment surface.

14. The surgical stapler of claim **13**, further comprising a handle assembly removably couplable to the proximal end of the elongate shaft, wherein the handle assembly comprises a latch release mechanism positionable in contact with the abutment surface of the latch member when the handle assembly is coupled to the elongate shaft.

* * * * *

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专利名称(译)	具有锁定关节的手术吻合器		
公开(公告)号	US10448949	公开(公告)日	2019-10-22
申请号	US15/230833	申请日	2016-08-08
[标]申请(专利权)人(译)	应用医疗资源		
申请(专利权)人(译)	应用医疗资源CORPORATION		
当前申请(专利权)人(译)	应用医疗资源CORPORATION		
[标]发明人	DECKER STEVEN E PATEL ATAL C NELSON ERIK		
发明人	DECKER, STEVEN E. PATEL, ATAL C. NELSON, ERIK		
IPC分类号	A61B1/008 A61B17/072 A61B17/115 A61B17/068 A61B17/29		
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其他公开文献	US20170035419A1		
外部链接	Espacenet		

摘要(译)

腹腔镜手术吻合器可包括在细长轴和钳口组件之间的铰接接头。铰接接头可包括门锁机构，该门锁机构允许使用者选择性地允许钳口组件以非门锁构造相对于细长轴自由枢转，并且可定位在对准位置或门锁构造中的多个预定铰接位置之一。铰接接头的门锁机构偏置到门锁配置，并且可以“推开”方式操作。

