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

CHIRURGISCHES KLAMMERGERÄT MIT VERRIEGELUNGSGELENK

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EP 3 331 455 B1

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Description

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 62/201,995, entitled "SURGICAL STAPLER HAVING LOCKING ARTICULATION JOINT," filed August 6, 2015, currently pending.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0002] The present application relates generally to surgical occlusion instruments and, more particularly, to surgical staplers.

DESCRIPTION OF THE RELATED ART

[0003] 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.

[0004] From document EP 2 772 192 it is known 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. This instrument has 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, the articulation joint comprising a central pivot defining a pivot axis of the articulation joint and a support member having a plurality of latch recess-

es. A locking sled is longitudinally slidable with respect to the longitudinal axis of the shaft, the locking sled slidable between a distal position in which the articulation joint is in the unlatched configuration and a proximal position in which the locking sled allows a locking bar to engage one of the plurality of latch recesses such that the articulation joint is in the latched configuration. The support member has a proximal end and a distal end and the plurality of latch recesses is positioned adjacent the proximal end. The instrument further comprises 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.

SUMMARY OF THE INVENTION

[0005] In certain embodiments, a surgical stapler is described. A surgical stapler comprising: an elongate shaft having a proximal end and a distal end and defining a longitudinal axis (L) 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, the articulation joint comprising: 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 (L) 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 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; 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.

[0006] The articulation joint comprises further a pivot pin and an alignment spring. The pivot pin pivotally cou-

ples 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

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

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

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

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

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

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

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

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

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

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

DETAILED DESCRIPTION OF THE INVENTION

[0008] With reference to Figure 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. Figure 1 illustrates the surgical stapler 10 with the jaw assembly 30 in an open configuration.

[0009] With continued reference to Figure 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.

[0010] With continued reference to Figure 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.

[0011] With continued reference to Figure 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 (Figure 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.

[0012] With continued reference to Figure 1, in the illustrated embodiment, the jaw assembly 30 can be actuated from an open configuration (Figure 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.

[0013] With continued reference to Figure 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.

[0014] 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.

[0015] With reference to Figures 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.

[0016] With reference to Figure 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.

[0017] With continued reference to Figure 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.

[0018] 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.

[0019] With reference to Figures 4 and 5, the latch mechanism of the articulation joint is illustrated in an aligned position (Figure 4) and an articulated position (Figure 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.

[0020] With continued reference to Figures 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 (Figure 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.

[0021] 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.

[0022] With reference to Figure 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 there-through when the articulation joint is in an articulated position.

[0023] With reference to Figure 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 member 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.

[0024] 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.

[0025] With reference to Figures 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. Figure 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. Figure 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.

[0026] With reference to Figures 8 and 10, operation of the articulation latch lever to push the latch member 130 is illustrated. As illustrated in Figure 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 (Figure 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.

[0027] 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.

Claims

1. A surgical stapler (10) comprising:

an elongate shaft (20) having a proximal end (22) and a distal end (24) and defining a longitudinal axis (L) between the proximal end (22) and the distal end (24);

a jaw assembly (30) positioned at the distal end (24) of the elongate shaft (20), the jaw assembly (30) comprising:

a first jaw (32); and

a second jaw (34);

wherein the jaw assembly (30) has an elongate configuration defining a jaw axis;

an articulation joint (26) coupling the elongate shaft to the jaw assembly (30), the articulation joint (26) having an unlatched configuration in which the jaw assembly (30) is pivotable with respect to the elongate shaft (20) upon application of an external force to the jaw assembly (30) and a latched configuration in which the jaw assembly (30) is pivotally secured with respect to the elongate shaft (20), the articulation joint (26) comprising:

a support member (110) having a central pivot (114) defining a pivot axis of the articulation joint (26) and a plurality of latch recesses (118); and

a latch member (130) longitudinally slidable with respect to the longitudinal axis (L) of the shaft (20), the latch member (130) slidable between a distal position in which the articulation joint (26) is in the unlatched configuration and a proximal position in which the latch member (130) engages one of the

plurality of latch recesses (118) such that the articulation joint (26) is in the latched configuration;

wherein the support member (110) has a proximal end and a distal end and the plurality of latch recesses (118) is positioned adjacent the proximal end and wherein the latch member (130) extends across the proximal end of the support member (110) in both the proximal position and the distal position; and

a handle assembly (40) positioned at the proximal end (22) of the elongate shaft (20), the handle assembly (40) comprising an articulation latch lever (162), wherein the articulation latch lever (162) is movable between a proximal, latched position in which the articulation joint (26) is in the latched configuration and a distal, unlatched position in which the articulation joint (26) is in the unlatched configuration.

2. The surgical stapler of Claim 1, wherein the articulation joint (26) is biased to the latched configuration.

3. The surgical stapler of any of the preceding claims, wherein the plurality of latch recesses (118) each comprise an open end at a distal end thereof and a closed end at a proximal end thereof and wherein the latch member (130) engages the open end of one of the latch recesses (118) with the articulation joint (26) in the latched configuration.

4. The surgical stapler of any of the preceding claims, wherein the plurality of latch recesses (118) is arranged along an arc segment proximal of the central pivot (114) such that each latch recess (118) defines a corresponding latched position of the articulation joint (26).

5. The surgical stapler of any of the preceding claims, wherein the latch member (130) comprises an elongate member (134) extending within the elongate shaft (20) from the proximal end (22) of the elongate shaft (20) to the distal end (24) of the elongate shaft (20), the elongate member (134) having a proximal end (136) and a distal end, and the latch member further comprising a latching tooth (132) at the distal end of the elongate member (134), the latching tooth (132) configured to engage one of the plurality of latch recesses (118).

6. The surgical stapler of Claim 5, wherein the elongate member (134) is biased proximally to bias the articulation joint (26) to the latched configuration.

7. The surgical stapler of Claim 6, wherein the elongate shaft (20) comprises a spring biasing the elongate

member (134) proximally.

8. The surgical stapler of any of the preceding claims, wherein the articulation joint (26) further comprises:

a pivot pin (126) pivotally coupling the jaw assembly (30) to the elongate shaft (20), the pivot pin (126) having a wedge profile; and
an alignment spring (156) spanning the wedge profile of the pivot pin (126), the alignment spring (156) biasing the jaw axis into alignment with the longitudinal axis.

9. The surgical stapler of any of the preceding claims, wherein the support member further comprises:

a first support link pivot (116) laterally offset from the central pivot (114); and
a second support link pivot (116) laterally offset from the central pivot (114) opposite the first support link pivot.

10. The surgical stapler of Claim 9, wherein the articulation joint further comprises:

a first support link (140) extending from the first support link pivot (116) proximally into the elongate shaft (20); and
a second support link (140) extending from the second support link pivot (116) proximally into the elongate shaft (20).

11. The surgical stapler of Claim 8, wherein the wedge profile of the pivot pin (126) is defined by a first substantially planar face (128) on a lateral edge thereof and a second substantially planar face (129) opposite the first substantially planar face (128).

12. The surgical stapler of Claim 11, wherein the alignment spring (156) has a first leg (152) abutting the first substantially planar face (128) and a second leg (154) abutting the second substantially planar face (129).

Patentansprüche

1. Ein chirurgisches Klammergerät (10), das Folgendes beinhaltet:

einen länglichen Schaft (20), der ein proximales Ende (22) und ein distales Ende (24) aufweist und eine Längsachse (L) zwischen dem proximalen Ende (22) und dem distalen Ende (24) definiert;
eine Backenbaugruppe (30), die am distalen Ende (24) des länglichen Schafts (20) positioniert ist, wobei die Backenbaugruppe (30) Folgendes

beinhaltet:

eine erste Backe (32); und
eine zweite Backe (34);
wobei die Backenbaugruppe (30) eine längliche Konfiguration aufweist, die eine Backenachse definiert;
eine Gelenkverbindung (26), die den länglichen Schaft mit der Backenbaugruppe (30) koppelt, wobei die Gelenkverbindung (26) eine unverriegelte Konfiguration, in der die Backenbaugruppe (30) in Bezug auf den länglichen Schaft (20) drehbar ist, wenn eine externe Kraft auf die Backenbaugruppe (30) angewendet wird, und eine verriegelte Konfiguration, in der die Backenbaugruppe (30) in Bezug auf den länglichen Schaft (20) drehbar befestigt ist, aufweist, wobei die Gelenkverbindung (26) Folgendes beinhaltet:

ein Stützelement (110), das einen zentralen Drehpunkt (114), der eine Drehachse der Gelenkverbindung (26) definiert, und eine Vielzahl von Verriegelungsaussparungen (118) aufweist; und

ein Verriegelungselement (130), das in Bezug auf die Längsachse (L) des Schafts (20) in Längsrichtung verschiebbar ist, wobei das Verriegelungselement (130) zwischen einer distalen Position, in der die Gelenkverbindung (26) in der unverriegelten Konfiguration ist, und einer proximalen Position, in der das Verriegelungselement (130) mit einer der Vielzahl von Verriegelungsaussparungen (118) Eingriff nimmt, verschiebbar ist, sodass die Gelenkverbindung (26) sich in der verriegelten Konfiguration befindet; wobei das Stützelement (110) ein proximales Ende und ein distales Ende aufweist, und die Vielzahl von Verriegelungsaussparungen (118) neben dem proximalen Ende positioniert sind, und wobei das Verriegelungselement (130) sich sowohl in der proximalen Position als auch der distalen Position über das proximale Ende des Stützelements (110) erstreckt; und

eine Handgriffbaugruppe (40), die am proximalen Ende (22) des länglichen Schafts (20) positioniert ist, wobei die Handgriffbaugruppe (40) einen Gelenkverriegelungshebel (162) beinhaltet, wobei der Gelenkverriegelungshebel (162) zwischen einer pro-

ximalen, verriegelten Position, in der die Gelenkverbindung (26) in der verriegelten Konfiguration ist, und einer distalen, unverriegelten Position, in der die Gelenkverbindung (26) in der unverriegelten Konfiguration ist, bewegbar ist.

2. Das chirurgische Klammergerät gemäß Anspruch 1, wobei die Gelenkverbindung (26) zu der verriegelten Konfiguration vorgespannt ist.
3. Das chirurgische Klammergerät gemäß einem der vorhergehenden Ansprüche, wobei die Vielzahl von Verriegelungsaussparungen (118) jeweils ein offenes Ende an einem distalen Ende davon und ein geschlossenes Ende an einem proximalen Ende davon beinhalten und wobei das Verriegelungselement (130) Eingriff mit dem offenen Ende von einer der Verriegelungsaussparungen (118) nimmt, wenn die Gelenkverbindung (26) in der verriegelten Konfiguration ist.
4. Das chirurgische Klammergerät gemäß einem der vorhergehenden Ansprüche, wobei die Vielzahl von Verriegelungsaussparungen (118) an einem Bogensegment entlang proximal zu dem zentralen Drehpunkt (114) angeordnet ist, sodass jede Verriegelungsaussparung (118) eine entsprechende verriegelte Position der Gelenkverbindung (26) definiert.
5. Das chirurgische Klammergerät gemäß einem der vorhergehenden Ansprüche, wobei das Verriegelungselement (130) ein längliches Element (134) beinhaltet, das sich innerhalb des länglichen Schafts (20) von dem proximalen Ende (22) des länglichen Schafts (20) zu dem distalen Ende (24) des länglichen Schafts (20) erstreckt, wobei das längliche Element (134) ein proximales Ende (136) und ein distales Ende aufweist, und wobei das Verriegelungselement ferner einen Verriegelungszahn (132) an dem distalen Ende des länglichen Elements (134) beinhaltet, wobei der Verriegelungszahn (132) zur Eingriffnahme mit einer von der Vielzahl von Verriegelungsaussparungen (118) konfiguriert ist.
6. Das chirurgische Klammergerät gemäß Anspruch 5, wobei das längliche Element (134) proximal vorgespannt, um die Gelenkverbindung (26) zu der verriegelten Konfiguration vorzuspannen.
7. Das chirurgische Klammergerät gemäß Anspruch 6, wobei der längliche Schaft (20) eine Feder beinhaltet, die das längliche Element (134) proximal vorspannt.
8. Das chirurgische Klammergerät gemäß einem der vorhergehenden Ansprüche, wobei die Gelenkverbindung (26) ferner Folgendes beinhaltet:

einen Drehstift (126), der die Backenbaugruppe (30) drehbar mit dem länglichen Schaft (20) koppelt, wobei der Drehstift (126) ein Keilprofil aufweist; und
eine Ausrichtungsfeder (156), die das Keilprofil des Drehstifts (126) überspannt, wobei die Ausrichtungsfeder (156) die Backenachse so vorspannt, dass sie mit der Längsachse ausgerichtet ist.

9. Das chirurgische Klammergerät gemäß einem der vorhergehenden Ansprüche, wobei das Stützelement ferner Folgendes beinhaltet:

einen ersten Stützverbindungsdrehpunkt (116), der lateral zu dem zentralen Drehpunkt (114) versetzt ist; und
einen zweiten Stützverbindungsdrehpunkt (116), der lateral zu dem zentralen Drehpunkt (114) versetzt ist, der dem ersten Stützverbindungsdrehpunkt gegenüberliegt.

10. Das chirurgische Klammergerät gemäß Anspruch 9, wobei die Gelenkverbindung ferner Folgendes beinhaltet: eine erste Stützverbindung (140), die sich von dem ersten Stützverbindungsdrehpunkt (116) proximal in den länglichen Schaft (20) hinein erstreckt; und
eine zweite Stützverbindung (140), die sich von dem zweiten Stützverbindungsdrehpunkt (116) proximal in den länglichen Schaft (20) hinein erstreckt.

11. Das chirurgische Klammergerät gemäß Anspruch 8, wobei das Keilprofil des Drehstifts (126) durch eine erste im Wesentlichen planare Fläche (128) auf einer lateralen Kante davon und eine zweite im Wesentlichen planare Fläche (129), die der ersten im Wesentlichen planaren Fläche (128) gegenüberliegt, definiert wird.

12. Das chirurgische Klammergerät gemäß Anspruch 11, wobei die Ausrichtungsfeder (156) einen ersten Schenkel (152), der an die erste im Wesentlichen planare Fläche (128) anstößt, und einen zweiten Schenkel (154), der an die zweite im Wesentlichen planare Fläche (129) anstößt, aufweist.

Revendications

1. Agrafeuse chirurgicale (10) comprenant :

une tige allongée (20) ayant une extrémité proximale (22) et une extrémité distale (24) et définissant un axe longitudinal (L) entre l'extrémité proximale (22) et l'extrémité distale (24) ;
un ensemble de mâchoires (30) positionné au niveau de l'extrémité distale (24) de la tige al-

longée (20), l'ensemble de mâchoires (30) comprenant :

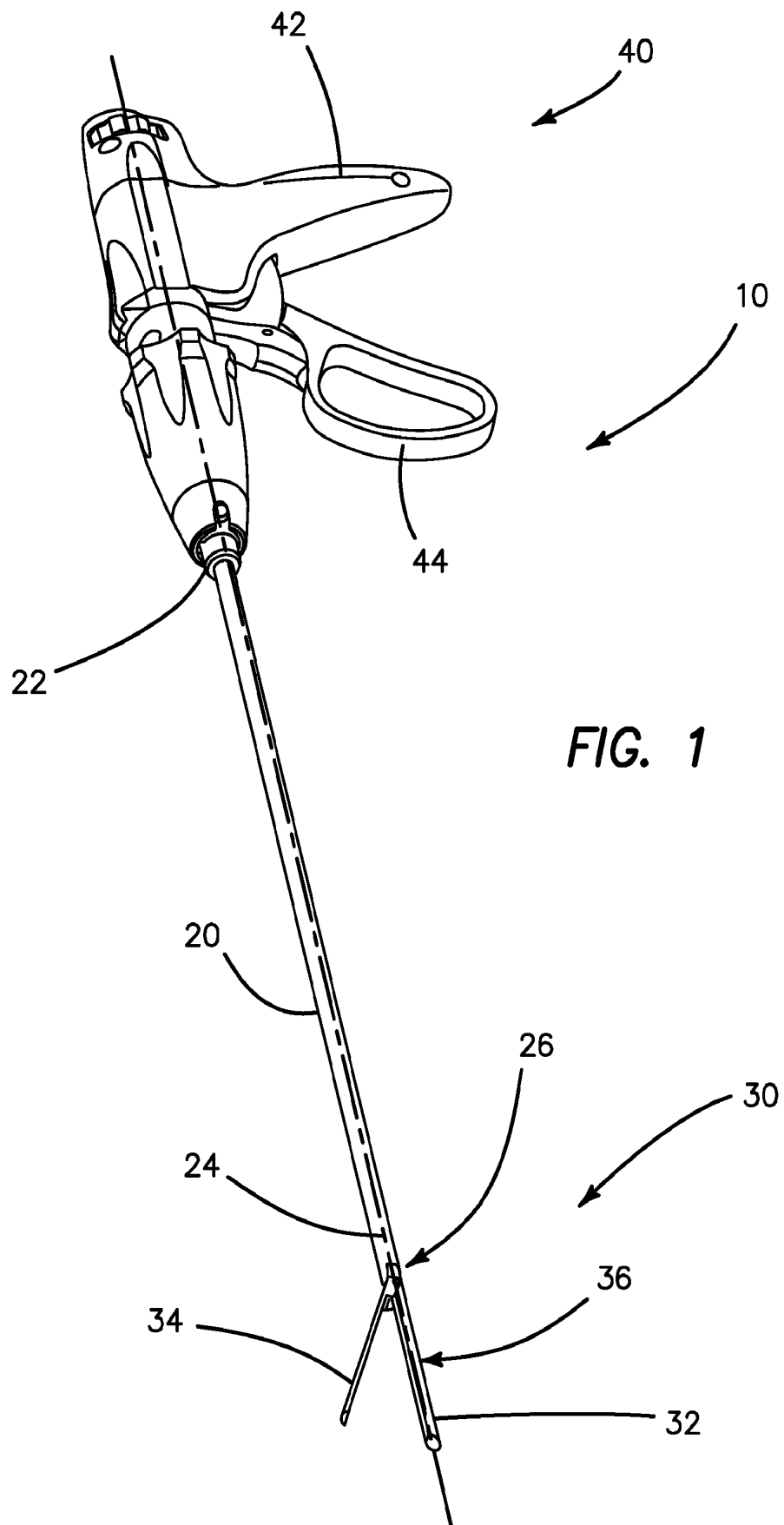
une première mâchoire (32) ; et
une deuxième mâchoire (34) ;
l'ensemble de mâchoires (30) ayant une configuration allongée définissant un axe de mâchoire ;

une jonction d'articulation (26) couplant la tige allongée à l'ensemble de mâchoires (30), la jonction d'articulation (26) ayant une configuration non verrouillée dans laquelle l'ensemble de mâchoires (30) est pivotable par rapport à la tige allongée (20) lors de l'application d'une force externe à l'ensemble de mâchoires (30) et une configuration verrouillée dans laquelle l'ensemble de mâchoires (30) est fixé de manière pivotante par rapport à la tige allongée (20), la jonction d'articulation (26) comprenant :

un élément de support (110) ayant un pivot central (114) définissant un axe de pivotement de la jonction d'articulation (26) et une pluralité d'évidements de verrouillage (118) ; et
un élément de verrouillage (130) pouvant coulisser dans le sens longitudinal par rapport à l'axe longitudinal (L) de la tige (20), l'élément de verrouillage (130) étant coulissable entre une position distale dans laquelle la jonction d'articulation (26) se trouve dans la configuration non verrouillée et une position proximale dans laquelle l'élément de verrouillage (130) s'engage dans l'une de la pluralité d'évidements de verrouillage (118) de sorte que la jonction d'articulation (26) se trouve dans la configuration verrouillée ;

dans lequel l'élément de support (110) possède une extrémité proximale et une extrémité distale et la pluralité d'évidements de verrouillage (118) est positionnée adjacente à l'extrémité proximale et dans lequel l'élément de verrouillage (130) s'étend à travers l'extrémité proximale de l'élément de support (110) à la fois dans la position proximale et la position distale ; et
un ensemble de poignée (40) positionné à l'extrémité proximale (22) de la tige allongée (20), l'ensemble de poignée (40) comprenant un levier de verrouillage d'articulation (162), dans lequel ledit levier de verrouillage d'articulation (162) peut être déplacé entre une position proximale, verrouillée dans laquelle la jonction d'articulation (26) se trouve dans la configuration verrouillée et une position distale, non verrouillée dans laquelle la jonction d'articulation

- (26) se trouve dans la configuration non verrouillée.
2. Agrafeuse chirurgicale selon la revendication 1, dans laquelle la jonction d'articulation (26) est sollicitée vers la configuration verrouillée. 5
 3. Agrafeuse chirurgicale selon l'une quelconque des revendications précédentes, dans laquelle la pluralité d'évidements de verrouillage (118) comprend chacune une extrémité ouverte à une extrémité distale de ceux-ci et une extrémité fermée à une extrémité proximale de ceux-ci et dans laquelle l'élément de verrouillage (130) s'engage dans l'extrémité ouverte de l'un des évidements de verrouillage (118) avec la jonction d'articulation (26) dans la configuration verrouillée. 10 15
 4. Agrafeuse chirurgicale selon l'une quelconque des revendications précédentes, dans laquelle la pluralité d'évidements de verrouillage (118) est disposée le long d'un segment en arc proximal du pivot central (114) de sorte que chaque évidement de verrouillage (118) définit une position verrouillée correspondante de la jonction d'articulation (26). 20 25
 5. Agrafeuse chirurgicale selon l'une quelconque des revendications précédentes, dans laquelle l'élément de verrouillage (130) comprend un élément allongé (134) s'étendant à l'intérieur de la tige allongée (20) depuis l'extrémité proximale (22) de la tige allongée (20) jusqu'à l'extrémité distale (24) de la tige allongée (20), l'élément allongé (134) ayant une extrémité proximale (136) et une extrémité distale, et l'élément de verrouillage comprenant en outre une dent de verrouillage (132) à l'extrémité distale de l'élément allongé (134), la dent de verrouillage (132) étant configurée pour s'engager dans l'une de la pluralité des évidements de verrouillage (118). 30 35 40
 6. Agrafeuse chirurgicale selon la revendication 5, dans laquelle l'élément allongé (134) est sollicité en position proximale de manière à solliciter la jonction d'articulation (26) en direction de la configuration verrouillée. 45
 7. Agrafeuse chirurgicale selon la revendication 6 dans laquelle la tige allongée (20) comprend un ressort sollicitant l'élément allongé (134) en position proximale. 50
 8. Agrafeuse chirurgicale selon l'une quelconque des revendications précédentes, dans laquelle la jonction d'articulation (26) comprend en outre : 55
 - un axe de pivotement (126) accouplant de manière pivotante l'ensemble de mâchoires (30) à la tige allongée (20), l'axe de pivotement (126) ayant un profil cunéiforme ; et
 - un ressort d'alignement (156) traversant le profil cunéiforme de l'axe de pivotement (126), le ressort d'alignement (156) sollicitant l'axe de la mâchoire en alignement avec l'axe longitudinal.
 9. Agrafeuse chirurgicale selon l'une quelconque des revendications précédentes, dans laquelle l'élément de support comprend en outre :
 - un premier pivot de liaison au support (116) décalé du pivot central (114) et
 - un deuxième pivot de liaison au support (116) décalé latéralement du pivot central (114) face au premier pivot de liaison au support.
 10. Agrafeuse chirurgicale selon la revendication 9, dans laquelle la jonction d'articulation comprend par ailleurs :
 - une première liaison au support (140) s'étendant depuis le premier pivot de liaison au support (116) en position proximale jusqu'à l'axe allongé (20) ; et
 - une deuxième liaison au support (140) s'étendant depuis le deuxième pivot de liaison au support (116) en position proximale jusqu'à l'axe allongé (20).
 11. Agrafeuse chirurgicale selon la revendication 8, dans laquelle le profil cunéiforme de l'axe de pivotement (126) est défini par une face sensiblement plane (128) située sur un bord latéral de celui-ci et une deuxième face sensiblement plane (129) faisant face à la première face sensiblement plane (128).
 12. Agrafeuse chirurgicale selon la revendication 11, dans laquelle le ressort d'alignement (156) a une première patte (152) adjacente à la première face sensiblement plane (128) et une deuxième patte (154) adjacente à la deuxième face sensiblement plane (129).



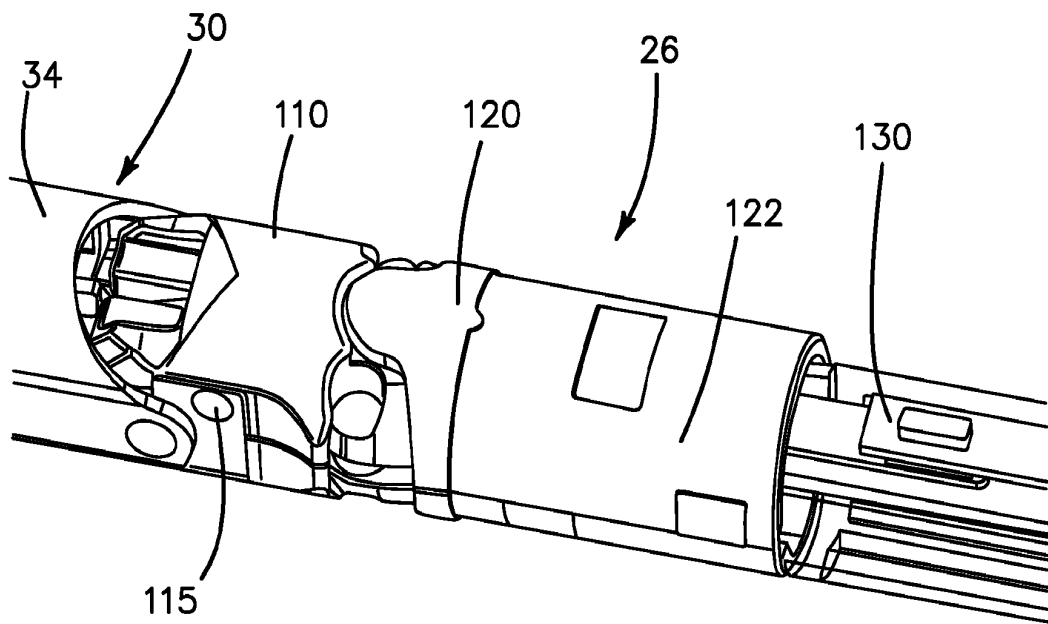


FIG. 2

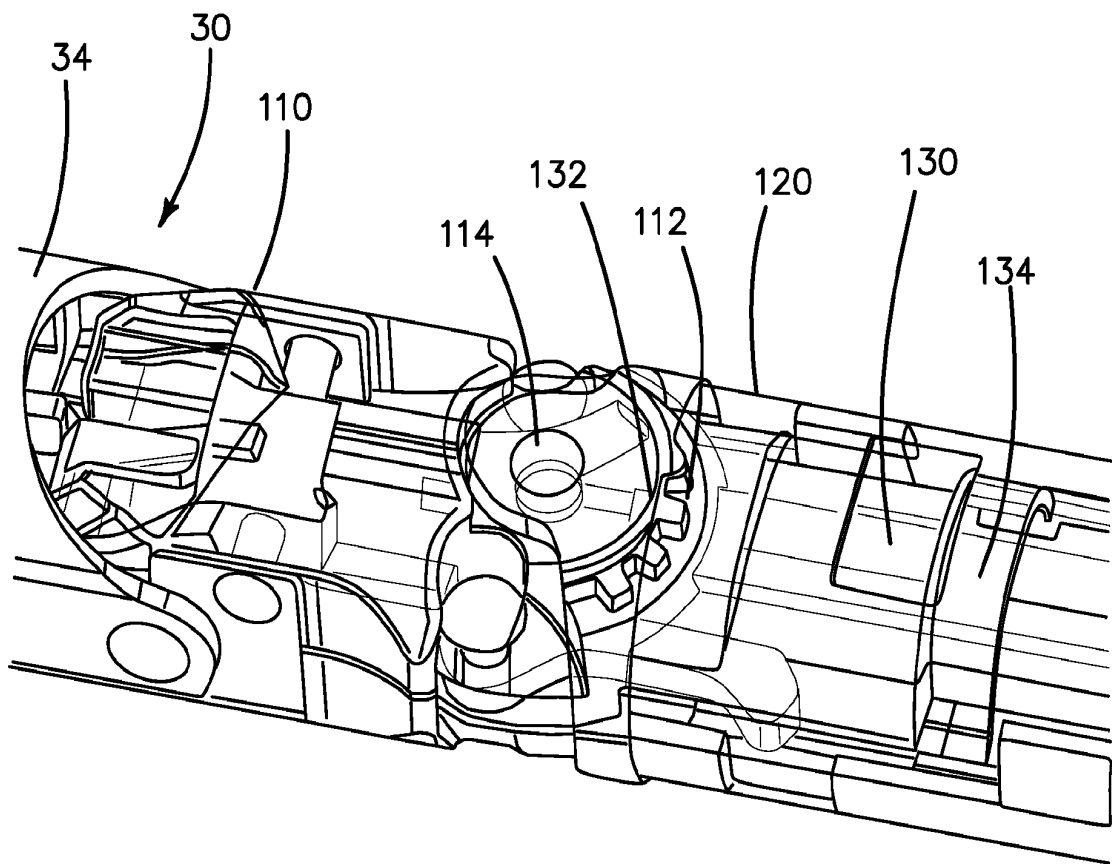
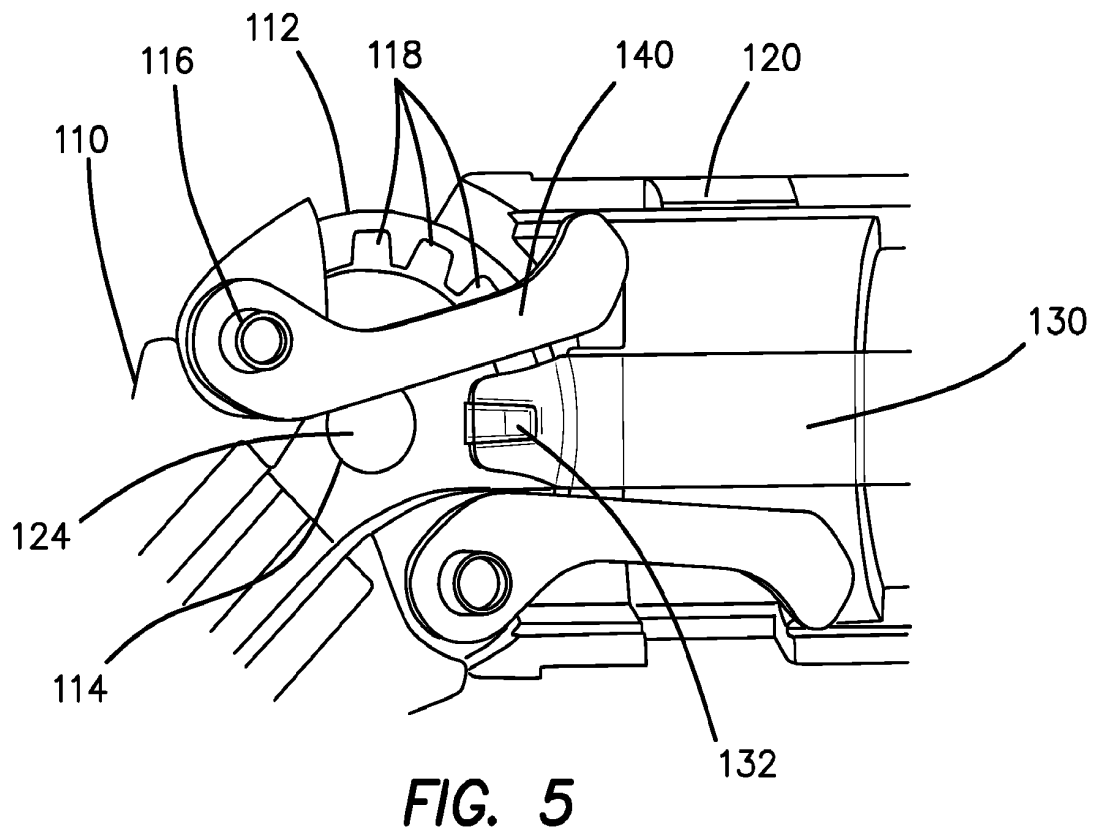
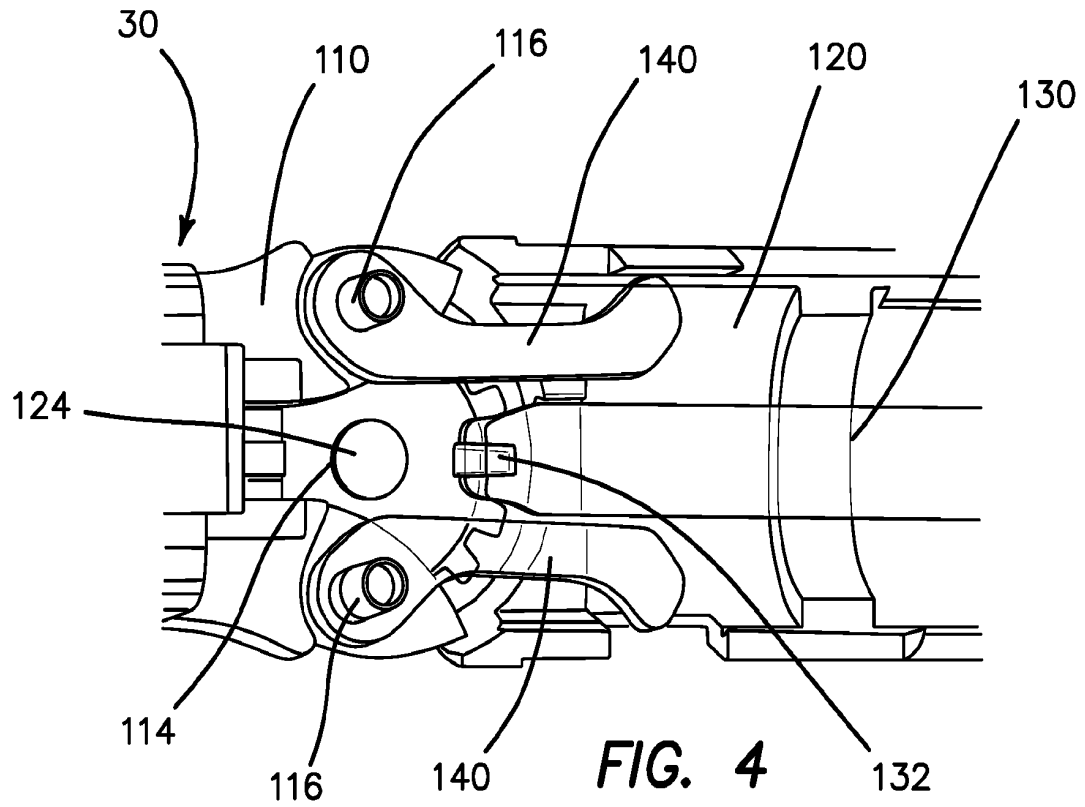


FIG. 3



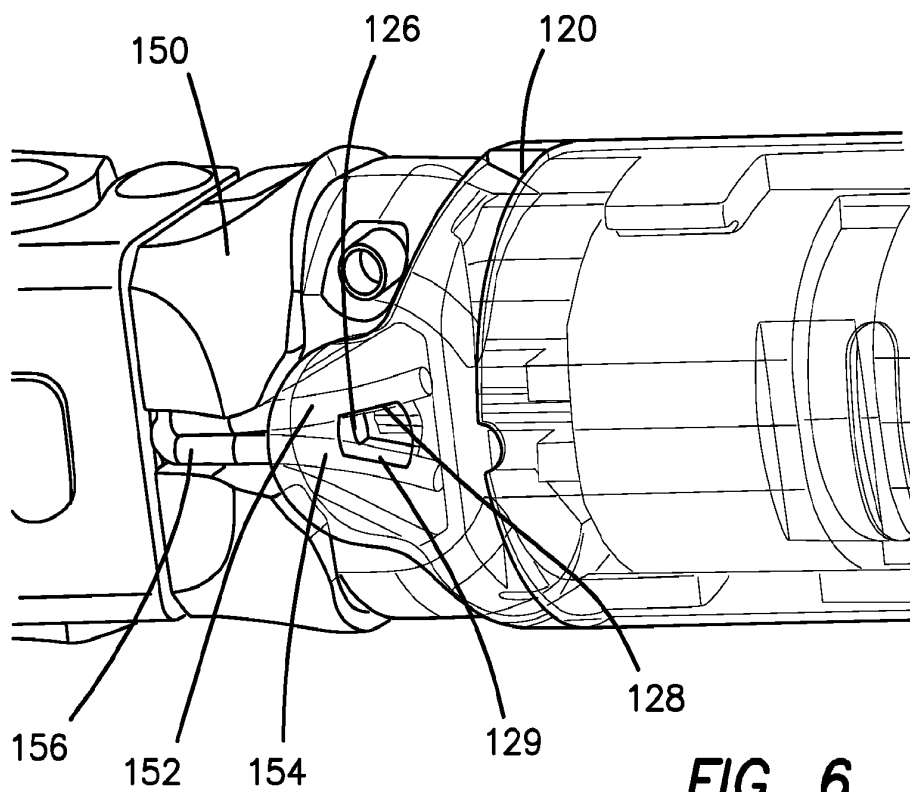


FIG. 6

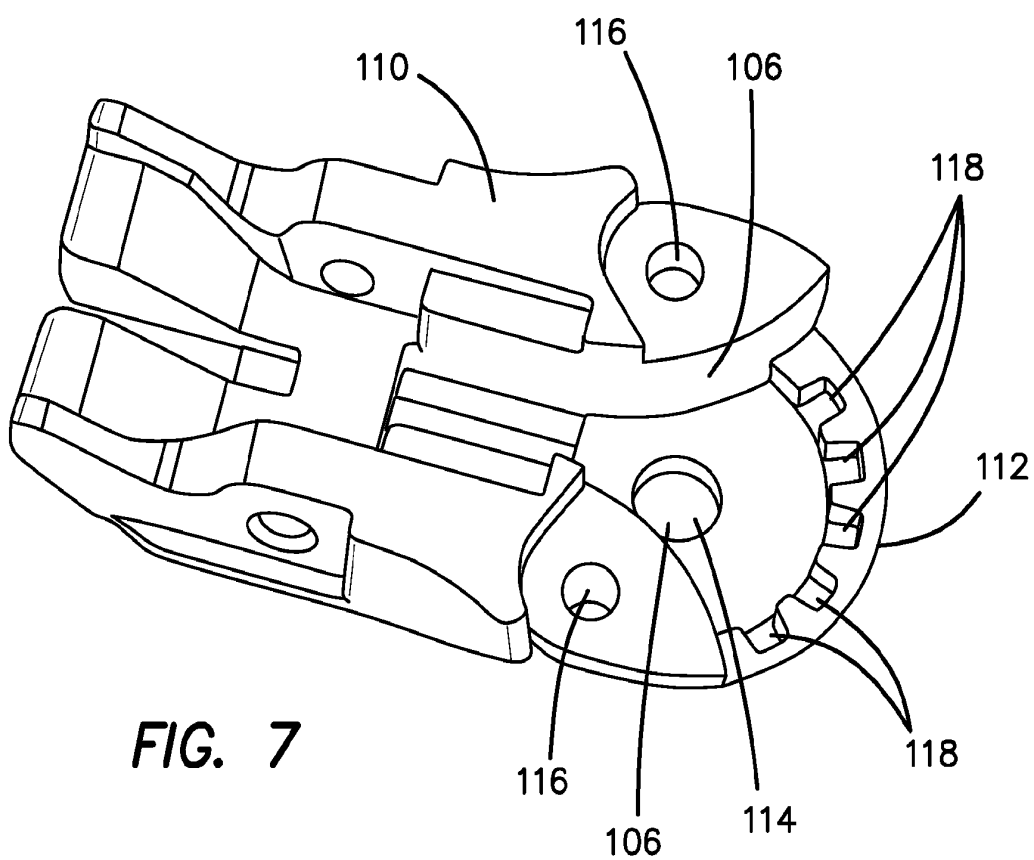


FIG. 7

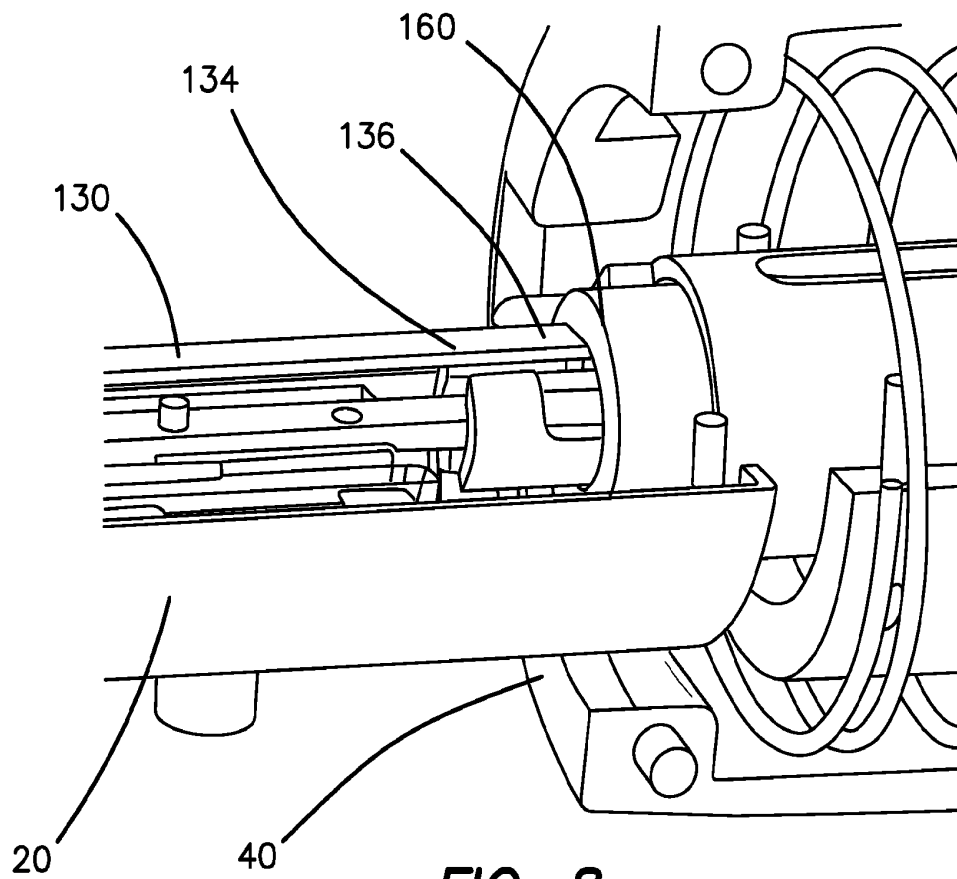


FIG. 8

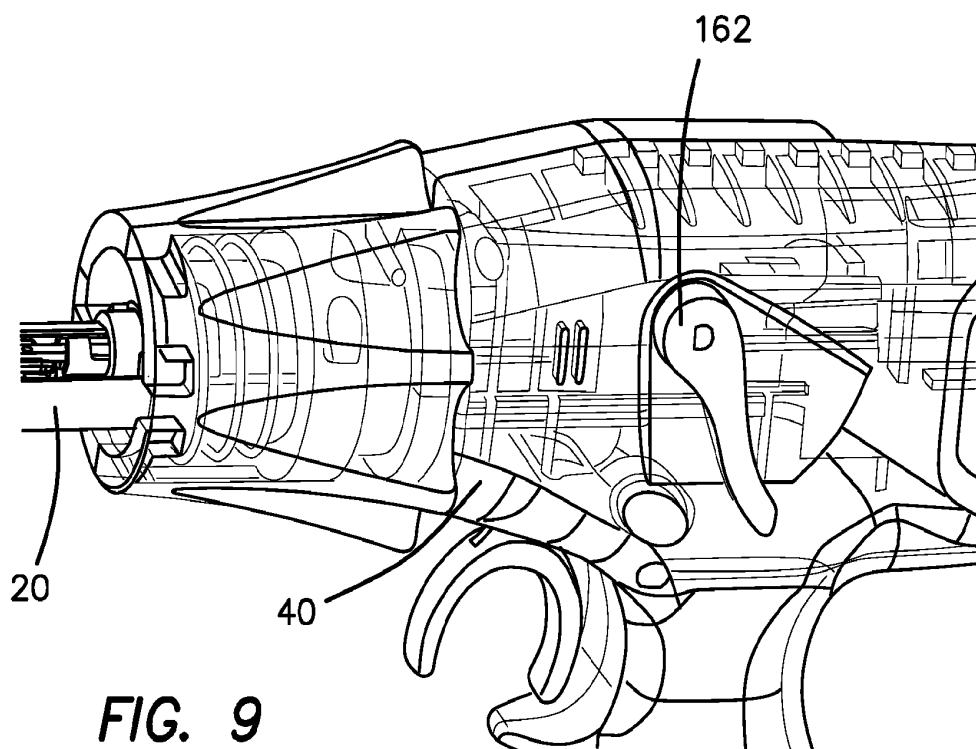


FIG. 9

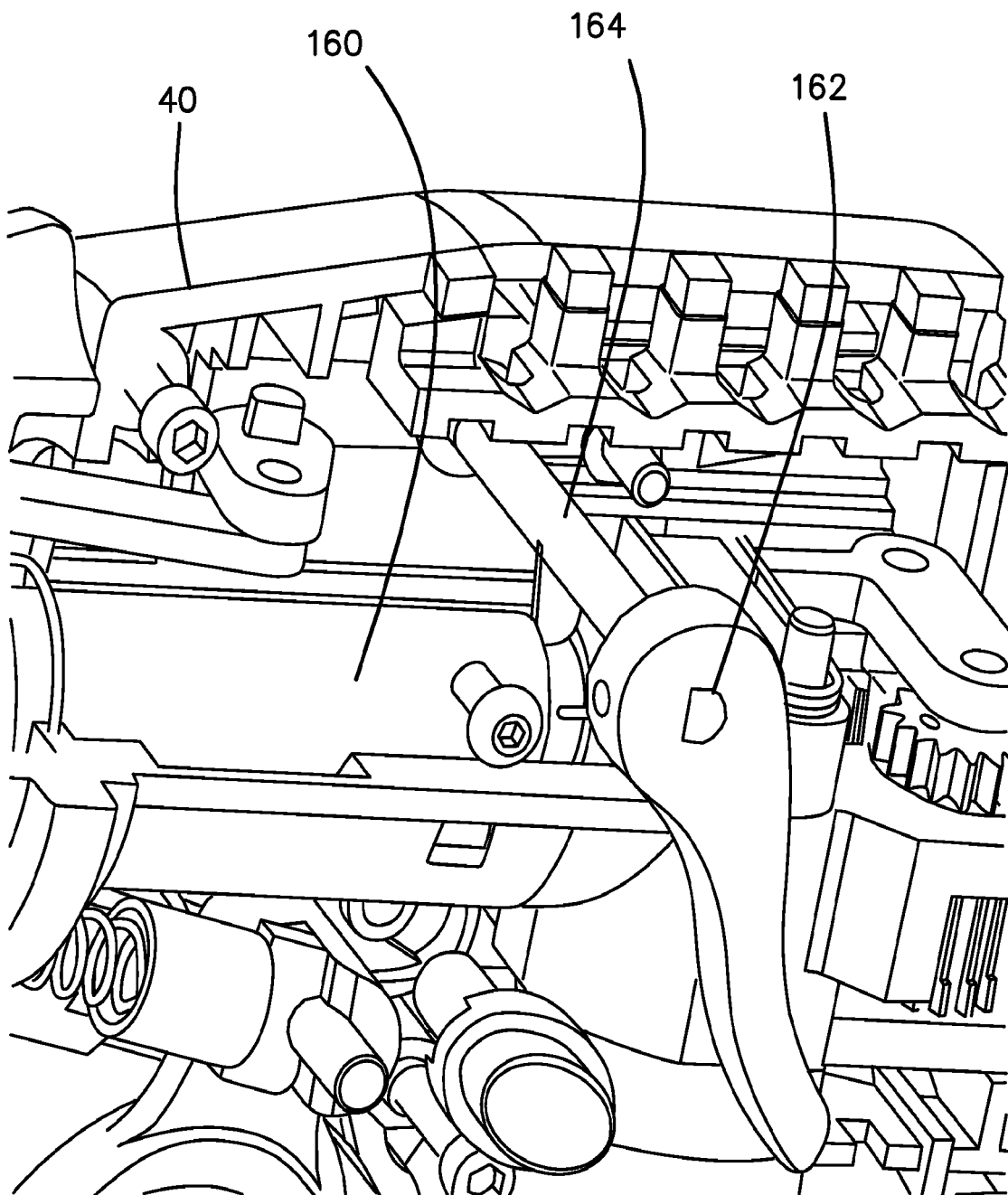


FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 62201995 A [0001]
- EP 2772192 A [0004]

专利名称(译)	具有锁定关节的手术吻合器		
公开(公告)号	EP3331455B1	公开(公告)日	2019-10-09
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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		
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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。

