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(54) **SYSTEM FOR DELIVERING A HAEMOSTATIC AGENT**

(71) Applicant: **Baxter Medical Systems GmbH + Co. KG**, Saalfeld (DE)

(72) Inventors: **Jordan Sylvester**, Saalfeld (DE); **Kirsten M. Emmons**, Saalfeld (DE); **Janet Tamborini**, Saalfeld (DE); **Heinz-Hermann Dalbert**, Saalfeld (DE)

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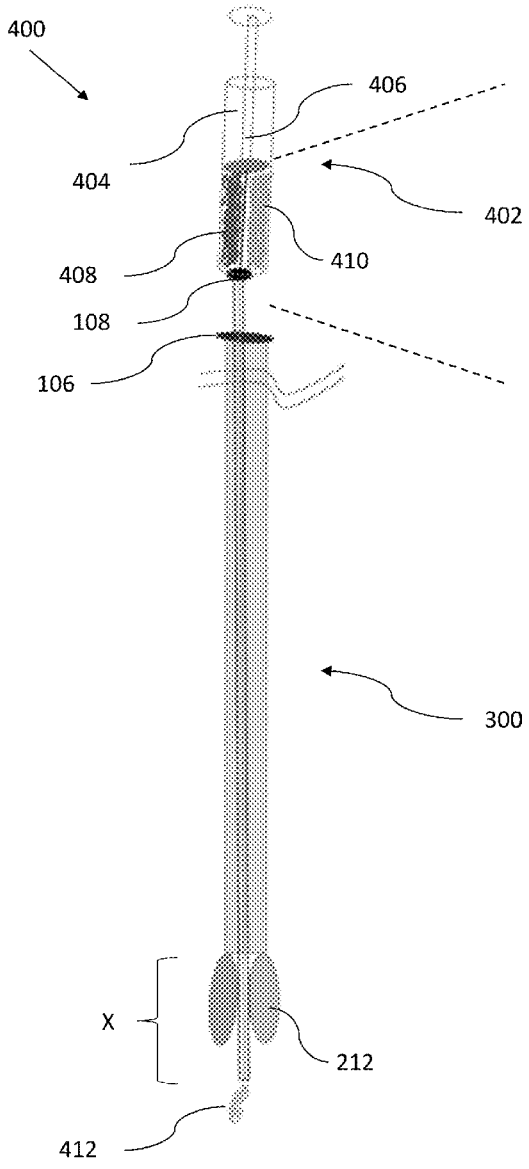
(57) **ABSTRACT**

A system for delivering a haemostatic agent is provided. The system comprising a minimally invasive surgical, MIS, instrument comprising a tube channel and a tube receivable in the tube channel. The tube comprises two fluidically separated flow channels, so that efflux from at least two syringe outlets is prevented from combining before reaching a distal end of the tube. A tube for use in the system, and a kit of parts, are also provided.



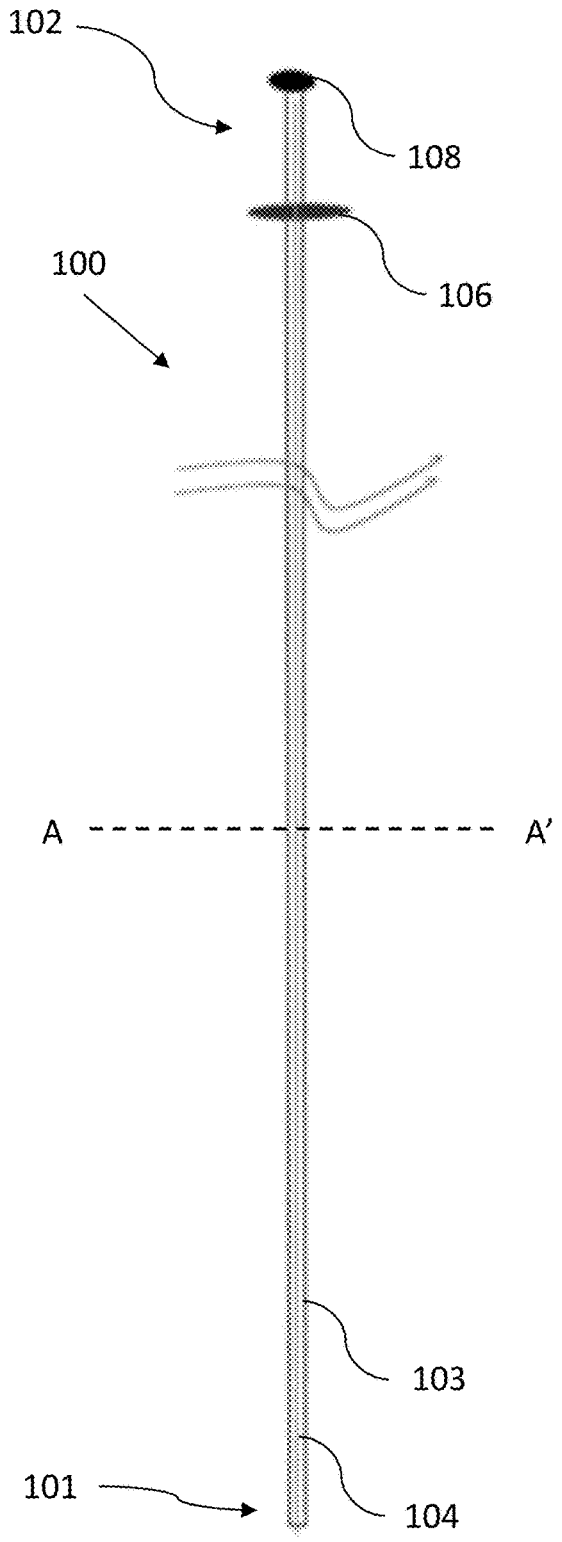


Figure 1

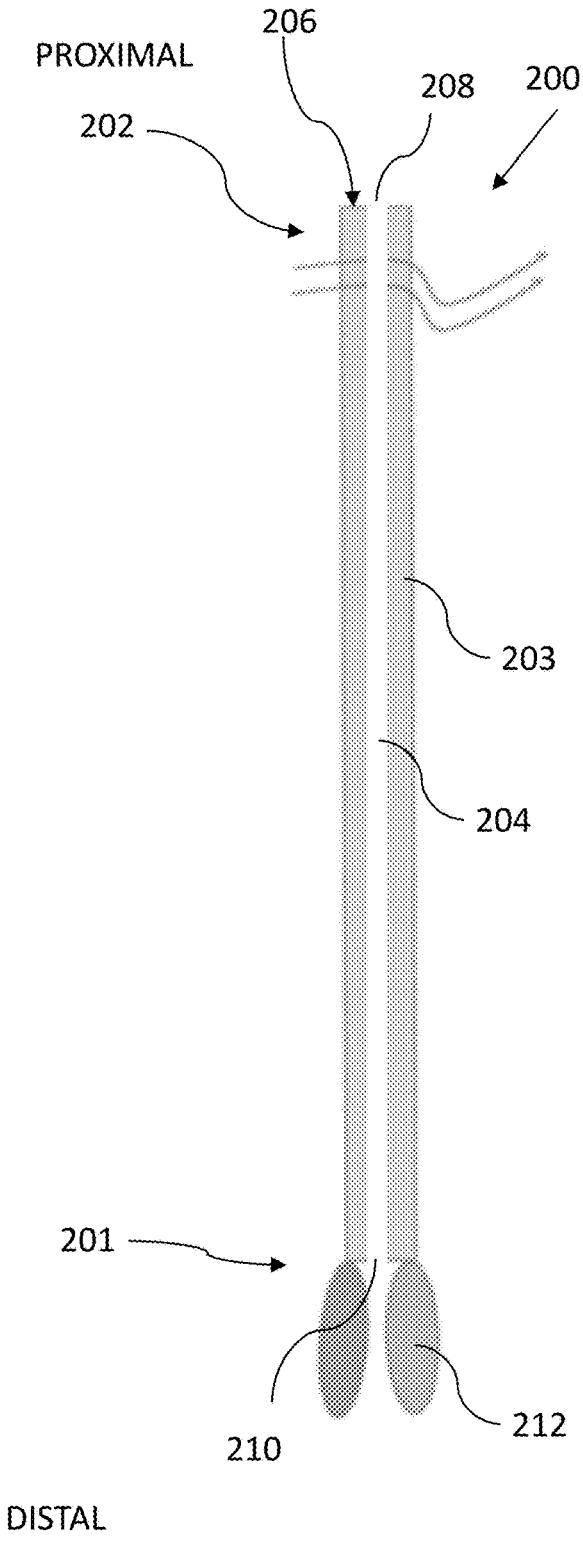


Figure 2

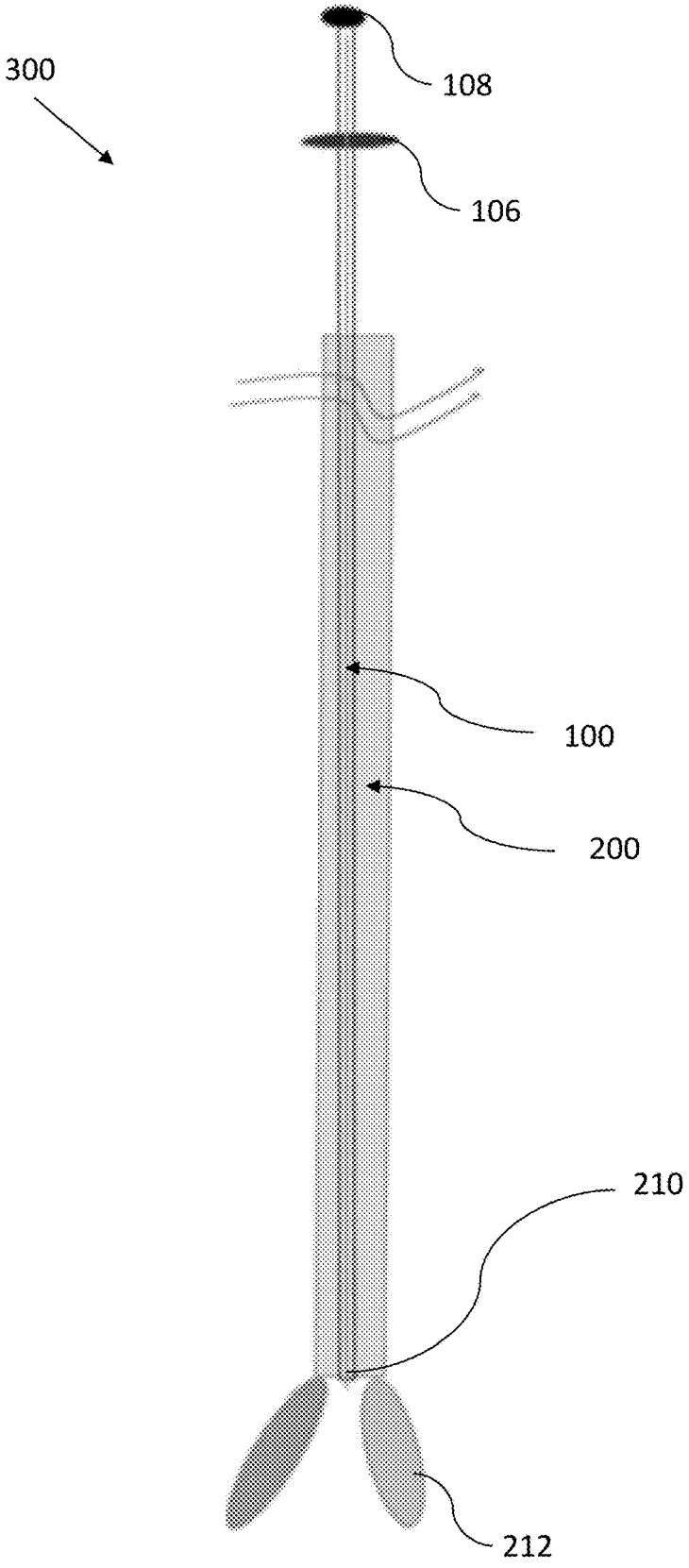


Figure 3

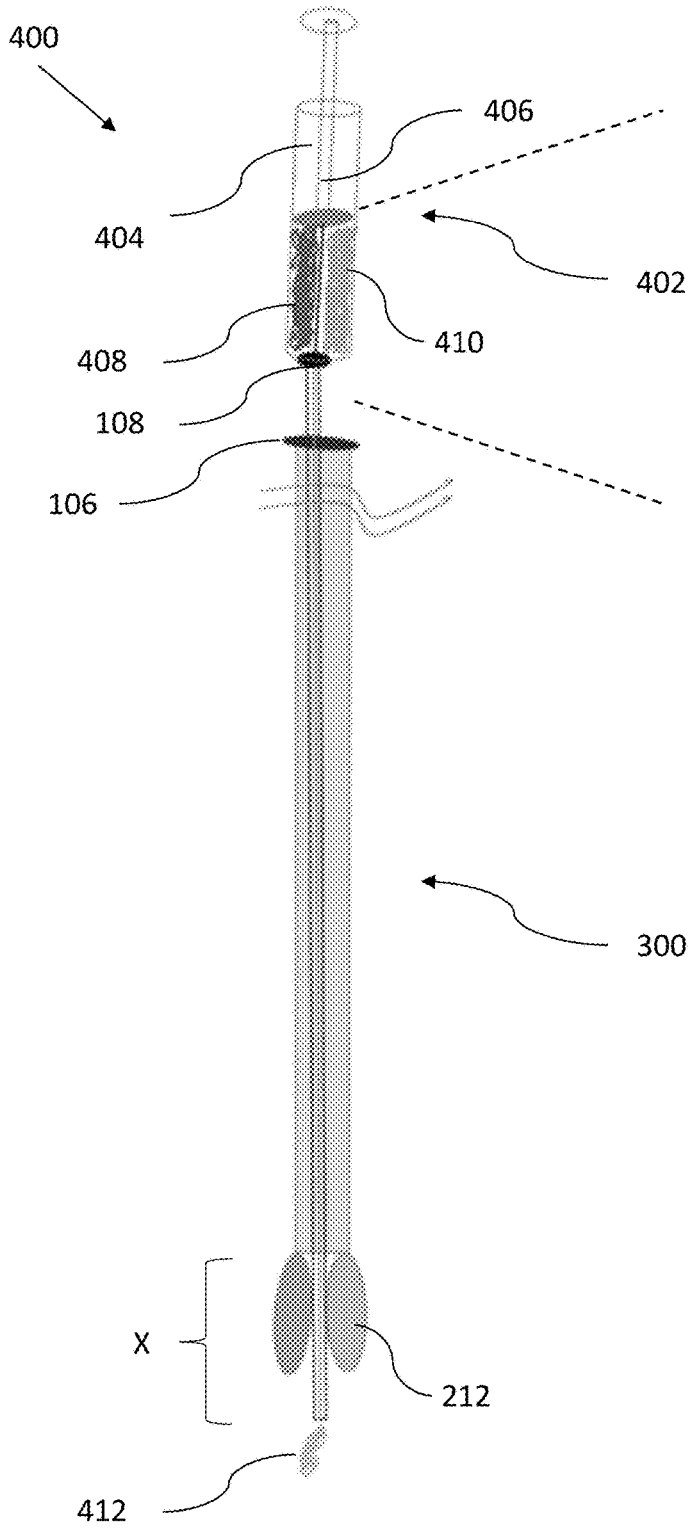


Figure 4A

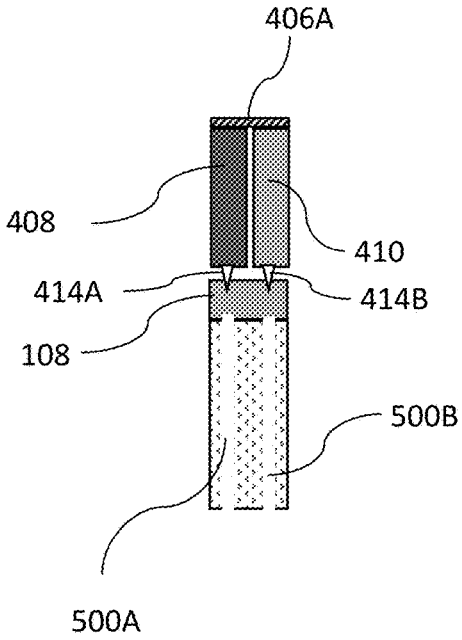


Figure 4B

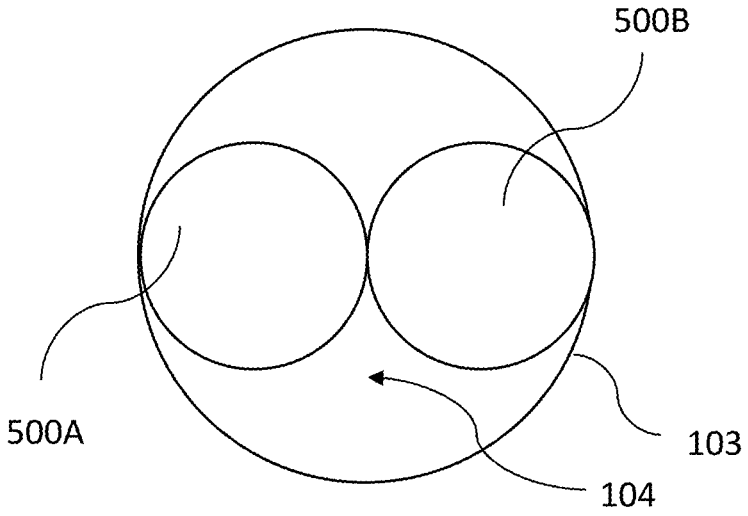


Figure 5A

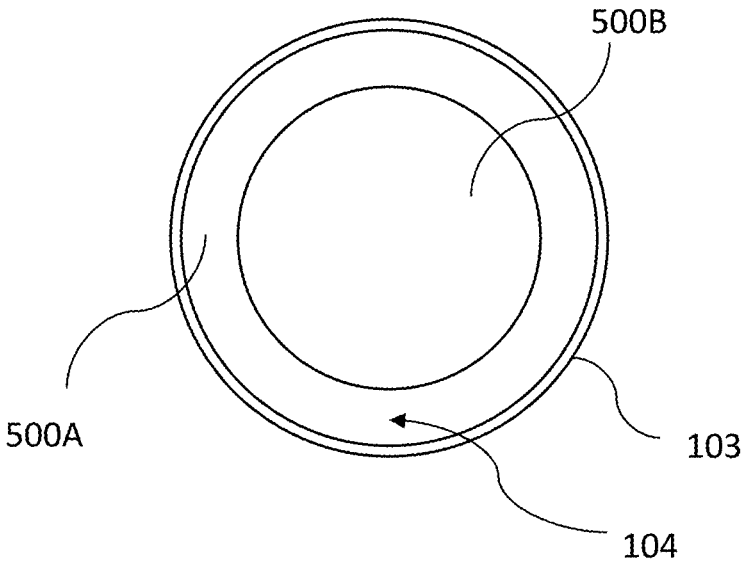


Figure 5B

SYSTEM FOR DELIVERING A HAEMOSTATIC AGENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of European Patent Application Serial No. 23159252.8, filed on Feb. 28, 2023, the entire disclosure of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to a system for delivering a haemostatic agent. In particular, the disclosure relates to a system comprising a minimally invasive surgical, MIS, instrument comprising a tube channel and a tube receivable in the tube channel. The tube comprises two fluidically separated flow channels, so that efflux from at least two syringe outlets is prevented from combining before reaching a distal end of the tube.

BACKGROUND

[0003] During surgery, incisions are made to investigate or treat pathological conditions. Minimally invasive surgery has been developed to accelerate and improve recovery from surgery, as well as reduce risk of infection and complications. Minimally invasive surgery includes surgical procedures which are performed minimizing the size and number of incisions.

[0004] A variety of minimally invasive surgical (MIS) instruments are known in the literature. When making incisions using a MIS instrument during surgery, it may be desirable to apply a haemostatic agent, or other substances which promote wound closure, promote wound healing, and/or reduce bleeding.

[0005] To provide the haemostatic agent to the incision, the MIS instrument must be removed, risking tissue damage and other complications. It has also been found that catheters, tubes, or microtubes used for delivering haemostatic agents to wounds can become occluded during use, and may thus be suitable only for a single application of a haemostatic agent.

[0006] The inventors have appreciated the need for a system which facilitates application of a haemostatic agent during minimally invasive surgery. The inventors have further appreciated the need for a tube for a MIS instrument which may be used to apply a haemostatic agent repeatedly.

SUMMARY

[0007] The present disclosure includes one or more of the features recited in the appended claims and/or the following features which, alone or in any combination, may comprise patentable subject matter. In various embodiments, the present disclosure discloses a system for delivering a haemostatic agent, a tube for use in the system, and a kit of parts, as defined in the appended claims, to which reference should now be made. Optional features are defined in the enclosed dependent claims.

[0008] According to a first aspect of the present disclosure, there is provided a system for delivering a haemostatic agent, comprising: a minimally invasive surgical, MIS, instrument comprising a tube channel; and a tube receivable in the tube channel. The tube comprises: a first flow channel; a second flow channel, fluidically separated from the first flow channel; and a connector, at a proximal end of the tube, connectable to at least two syringe outlets.

[0009] A first one of the at least two syringe outlets is connectable to the first flow channel, and a second one of the at least two syringe outlets is connectable to the second flow channel, so that efflux from the at least two syringe outlets is prevented from combining before reaching a distal end of the tube.

[0010] By preventing efflux from each of two syringe outlets from mixing, or combining, before reaching the distal end of the tube, the haemostatic agent is not formed from the combined effluxes until they reach the distal end of the tube. This may allow for the mixing process to occur only at the (distal) tip of the tube, so that the haemostatic agent can be applied at different times (that is, repeatedly) without occluding the (distal) outlet of the tube.

[0011] Additionally, by only allowing mixing at the distal tip of the tube, the formed haemostatic agent may be applied more precisely, i.e., at the desired position and in the desired amount, and without having to remove the MIS instrument to apply the haemostatic agent, owing to the tube channel in the MIS instrument.

[0012] As used herein, the term "distal" refers to portions of the system, tube, or MIS instrument positioned towards the outlet/tip, which is intended to contact, or be adjacent to, an incision, or wound, during surgery, while the term "proximal" refers to portions of the system, tube, or MIS instrument that are further from the incision (or wound) during surgery and closer to, for example, the hand of the user or the robotic manipulator holding or engaging the system.

[0013] The tube may be made of any suitable type of material. The tube may be flexible. Polymeric materials, such as plastics, in particular sterile plastics, may be suitable materials for the tube.

[0014] The tube may be referred to as a catheter, or as a microtube.

[0015] In some embodiments, the tube when received within the tube channel is movable between a first configuration, in which a distal end of the tube is contained within the tube channel, and a second configuration, in which the distal end of the tube projects, in a distal direction, from a distal end/outlet of the tube channel. In other words, in the second configuration, the distal end of the tube extends beyond, and out of, the distal end of the tube channel.

[0016] This may allow the haemostatic agent to be applied more precisely, e.g., exactly where required, when in the second configuration, without impeding the function of the MIS instrument, when in the first configuration. Allowing the tube to be retracted into the tube channel may also reduce any risk of damage to the tube.

[0017] In some embodiments, the system comprises a limiter configured so that the distal end of the tube projects from the distal end of the tube channel by a distance, X. The limiter may be configured to prevent a distal end of the tube from entering the tube channel, ensuring that the tube may easily be withdrawn by a user. The distance, X, may be any suitable distance which permits a haemostatic agent to be applied to an incision site when in the second configuration.

[0018] In some embodiments, the limiter is configured so that the distance X is adjustable. For example, the limiter may comprise a movable element, configured to be moved along the length of the tube and to be secured to the tube. In other embodiments, the limiter may comprise a fastener,

such as a screw, on the MIS instrument, which may selectively engage the tube to prevent movement of the tube in the tube channel. In still other embodiments, the limiter may comprise a tensioning means configured to be selectively tensioned, which in a tensioned state prevents movement of the tube in the tube channel.

[0019] In some embodiments, the tube may comprise the limiter, and the limiter may be configured to engage with a proximal end of the tube channel upon the tube being in the second configuration. Providing such a "passive" limiter on the tube may allow for tubes having differing lengths, or tubes with limiters at different positions along the respective tube, to be provided which, in the second configuration, project different distances X from the distal end of the tube channel. A "passive" limiter, which does not have moving parts, may be more reliable than a limiter comprising e.g. tensioning means or fasteners etc.

[0020] In some embodiments, the limiter comprises a flange having a diameter greater than a diameter of the tube channel. Such a simple flange may strengthen the tube at the same time as being configured to act as a "passive" limiter.

[0021] The limiter may prevent a proximal end portion of the tube from being receivable in the tube channel.

[0022] The MIS instrument may comprise, at a distal end, a surgical tool. In some embodiments, the surgical tool comprises a pair of jaws. A surgical tool having a pair of jaws and a retractable tube with two flow channels may synergize to provide a system which can be used for micro surgery, and repeated and selective application of a haemostatic agent.

[0023] In another embodiment, the distal end of the tube may project distally from the surgical tool. In this manner, the MIS instrument may more easily be kept in place during application of the haemostatic agent.

[0024] In some embodiments, the tube may be separable from the MIS instrument. In other words, the MIS instrument and the tube of the system may be separate components, which may be separated from one another. This may facilitate cleaning of the MIS instrument, whilst the tube may be provided as a disposable component, thus ensuring that the same MIS instrument, with a disposable tube, may easily be used in a sterile manner.

[0025] In some embodiments, the tube channel may alternatively be referred to as a conduit for the tube. The tube channel may extend from a proximal end of the MIS instrument to a distal end of the MIS instrument.

[0026] In some embodiments, the tube channel extends substantially along a longitudinal axis of the MIS instrument. This may facilitate precise application of the haemostatic agent.

[0027] In other embodiments, the tube channel may extend through the MIS instrument at an angle, relative to the longitudinal axis of the MIS instrument.

[0028] The connector may be a standardized connector. In some embodiments, the connector may be a Luer lock connector. The connector may allow for a syringe to be securely connected to the first and second flow channels.

[0029] In some embodiments, the system further comprises a syringe. The syringe may comprise: a first chamber having a first fluid outlet coupled to the first flow channel, the first chamber containing a first constituent; and a second chamber having a second fluid outlet coupled to the second flow channel, the second chamber containing a second constituent. As such, the syringe may be a dual-chamber, or dual-lumen, syringe, in which the respective constituents in the first and second chambers are prevented from mixing in the syringe and may only combine after they have passed through the respective fluid outlets.

[0030] The first constituent and second constituent, when combined, may form a haemostatic agent. The term "haemostatic agent" broadly relates to at least haemostats, sealants and adhesives, that is, to any substance suitable for promoting wound healing or wound closure or which reduces bleeding. In some embodiments, the haemostatic agent may be a fibrin glue. In other embodiments, the haemostatic agent may be a gelatin-based sealant. In still other embodiments, the haemostatic agent may be a glutaraldehyde-based adhesive.

[0031] The first constituent may comprise at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, glutaraldehyde; and the second constituent may comprise at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, and/or glutaraldehyde.

[0032] A diameter dt of the tube may be about 1 mm to about 10 mm. In some embodiments, it may be about 2 mm to about 5 mm, and still other embodiments, it may be about 3 mm to about 4 mm.

[0033] A diameter dtc of the tube channel may be about 1.5 mm to about 12 mm. In some embodiments, it may be about 2.5 mm to about 6 mm, and still other embodiments, it may be about 3 mm to about 4.5 mm.

[0034] In some embodiments, the diameter dtc may be substantially the same as the diameter dt. This may allow for the tube to be held substantially in place by friction.

[0035] In some embodiments, the MIS instrument is locked when the distal end of the tube projects from a, or the, distal end of the tube channel. In other words, the MIS instrument may be prevented from performing surgical functions when the tube is in the second configuration. This may prevent damage to the MIS instrument and/or the tube.

[0036] If the limiter is a screw or a tensioning means, the screw or tensioning means may be configured to lock a MIS instrument if the tube is in the second configuration. For example, if the MIS instrument comprises a pair of jaws, the system may be configured so that, when the tube is in the second configuration, the limiter is configured to hold the pair of jaws in an open configuration, preventing them from closing.

[0037] According to a second aspect of the present disclosure, there is provided a tube for use in the system according to the first aspect. The tube is receivable in a tube channel of a MIS instrument and comprises: a first flow channel; a second flow channel, fluidically separated from the first flow channel; and a connector, at a proximal end of the tube, connectable to at least two syringe outlets. A first of the at least two syringe outlets is connectable to the first flow channel, and a second of the at least two syringe outlets is connectable to the second flow channel, so that efflux from the at least two outlets is prevented from combining before reaching a distal end of the tube.

[0038] By preventing efflux from each of two syringe outlets from mixing, or combining, before reaching the distal end of the tube, the haemostatic agent is not formed from the combined effluxes until it reaches the distal end of the tube. This may allow for the mixing process to occur

only at the (distal) tip of the tube, so that the haemostatic agent can be applied at different times without occluding the (distal) outlet of the tube.

[0039] Additionally, by only allowing mixing at the distal tip of the tube, haemostatic agent may be applied more precisely, i.e., at the desired position and in the desired amount.

[0040] In some embodiments, the tube comprises a limiter configured to engage with a proximal end of a tube channel of a MIS instrument. In some embodiments, the tube is configured to project, distally, from a tube channel of a MIS instrument when the limiter abuts a proximal end of a tube channel of the MIS instrument. The limiter may comprise a flange having a diameter greater than a diameter of the tube channel.

[0041] In some embodiments, a diameter of the tube is about 1 mm to about 10 mm, optionally about 2 mm to about 5 mm, and further optionally about 3 mm to about 4 mm.

[0042] The connector may be a standardized connector. The connector may be a Luer lock connector. When present, the connector may allow for a syringe to be securely connected to the first and second flow channels.

[0043] It is noted that while preferably, the first syringe outlet and the second syringe outlet are outlets of a dual-chamber syringe, they may also be single outlets of separate single-chamber syringes.

[0044] According to a third aspect of the present disclosure, there is provided a kit of parts, comprising a tube according to the second aspect, and a syringe comprising: a first chamber having a first fluid outlet coupled to the first flow channel, the first chamber containing a first constituent; and a second chamber having a second fluid outlet coupled to the second flow channel, the second chamber containing a second constituent.

[0045] The first constituent and the second constituent, when combined, may form a haemostatic agent. Alternatively, the first constituent and second constituent when combined may form any other substance suitable for promoting wound healing or wound closure or which reduces bleeding, such as an adhesive.

[0046] According to a fourth aspect of the present disclosure, there is provided a method of dispensing a haemostatic agent at a surgical site, comprising: providing a system according to the first aspect; connecting the first flow channel to a first syringe outlet, and providing a first constituent via the first flow channel; connecting the second flow channel to a second syringe outlet, and providing a second constituent via the second flow channel; and mixing the first constituent and the second constituent at a distal tip of the tube to form a haemostatic agent.

[0047] Further features of the second, third, and fourth aspects of the present disclosure are described above in relation to the first aspect of the present disclosure.

[0048] It will be appreciated that features described in relation to one aspect of the present disclosure may also be applied equally to all of the other aspects of the present disclosure. Features described in relation to the first aspect of the present disclosure may be applied equally to the second, third, or fourth aspect of the present disclosure and vice versa. For example, apparatus features described in relation to the first aspect may be applied, mutatis mutandis, to the tube of the second aspect.

[0049] Additional features, which alone or in combination with any other feature(s), such as those listed above and/or those listed in the claims, can comprise patentable subject matter and will become apparent to those skilled in the art upon consideration of the following detailed description of various embodiments exemplifying the best mode of carrying out the embodiments as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

[0050] The detailed description particularly refers to the accompanying figures in which:

[0051] FIG. **1** shows a schematic side view of a tube according to the present disclosure;

[0052] FIG. **2** shows a schematic side view of a minimally invasive surgical, MIS, instrument according to the present disclosure;

[0053] FIG. **3** shows a schematic side view of a system for delivering a haemostatic agent according to the present disclosure, in a first configuration;

[0054] FIG. **4**A shows a schematic side view of the system of FIG. **3** in a second configuration;

[0055] FIG. **4**B shows an enlarged schematic portion of FIG. **4**A;

[0056] FIG. **5**A shows a cross section of a tube according to the present disclosure; and

[0057] FIG. **5**B shows a cross section of an alternative tube according to the present disclosure.

DETAILED DESCRIPTION

[0058] FIG. **1** shows a schematic side view of a tube **100**, or catheter, for a minimally invasive surgical, MIS, instrument. The tube **100** has a distal end **101** and a proximal end **102**. The tube **100** has an outer wall **103**. The outer wall surrounds a cavity, or lumen **104**, extending from the distal end **101** of the tube **100** to the proximal end **102** of the tube **100**.

[0059] Towards its proximal end **102**, the tube **100** comprises a stopper **106**, or limiter, formed of a perpendicular flange surrounding the outer wall **103**. The tube **100**, at its proximal end **102**, comprises a Luer lock connector **108** for fluidly connecting the cavity **104** to an outlet of a syringe.

[0060] FIG. **2** shows a schematic side view of a MIS instrument **200**, having a distal end **201** and a proximal end **202**. The MIS instrument **200** comprises a cylindrical portion **203** extending from the distal end **201** towards the proximal end **202**. The cylindrical portion **203** comprises a central, cylindrical, tube channel **204** for receiving a tube, such as tube **100**, for dispensing a haemostatic agent.

[0061] At the proximal end **202**, the MIS instrument **200** has an end surface **206**, which the flange **106** of the tube **100** is configured to abut. When the tube **100** is being received in the tube channel **204**, and the flange **106** abuts the proximal end surface **206** of the MIS instrument **200**, the tube **100** extends through an inlet **208** of the tube channel **204** and projects distally from the (distal) outlet **210** of the tube channel **204**, as discussed in more detail below with regards to FIG. **4**A.

[0062] At the distal end **201**, the MIS instrument **200** comprises a pair of jaws **212**, configured for performing minimally invasive surgery.

[0063] As shown in FIG. **3**, in a first configuration of a system **300** comprising the tube **100** and the MIS instrument **200**, the tube **100** is received within the tube channel **204** of the MIS instrument **200**, but does not project distally from the distal outlet **210** of the tube channel **204**.

[0064] An outer diameter of the tube **100** and an inner diameter of the tube channel **204** is substantially identical. Thus, friction between the outer wall **103** of the tube **100** and the inner wall of the tube channel **204** holds the tube **100** in the first configuration shown in FIG. **3**.

[0065] FIG. **4**A shows a system **400** comprising the system **300** in a second configuration, in which the tube **100** projects, by a distance X, distally from the distal outlet **210** of the tube channel **204**. In the second configuration of the tube **100**, the limiter **106**, or stopper, abuts the proximal end surface **206** of the MIS instrument **200**, which also forms a proximal end of the tube channel **204**. This prevents a proximal end **102** of the tube **100** from entering the tube channel **204**.

[0066] The position of the limiter **106** along the tube **100** relative to a length of the tube and a length of the tube channel **204** of the MIS instrument **200** determines the distance X by which the tube **100** projects distally from the distal outlet **210** of the tube channel **204**.

[0067] As shown in FIGS. **5**A and **5**B, within the cavity **104** of the tube **100**, the tube **100** comprises a first flow channel **500**A and a second flow channel **500**B. The first flow channel **500**A and the second flow channel **500**B may be arranged in any suitable configuration, such as side by side (see FIG. **5**A) or co-axially (see FIG. **5**B), as long as they are fluidically separated from one another.

[0068] Referring again to FIG. **4**A, the system **400** further comprises a syringe **402**, connected to the Luer lock connector **108** of the tube **100**. The syringe **402** comprises an interior **404**, and a plunger **406** movable within the interior **404** to force material from the syringe **402**. The interior **404** comprises a first chamber **408** and a second chamber **410**. The first and second chambers **408**, **410** are fluidically separated from one another, thus preventing the contents within the chambers **408**, **410** from mixing.

[0069] The first chamber **408** terminates in a first fluid outlet **414**A (as shown in the enlarged, schematic box diagram of FIG. **4**B), which is coupled, via the connector **108**, to the first flow channel **500**A. The first chamber **408** contains a first constituent of a haemostatic agent. The second chamber **410** terminates at a second fluid outlet **414**B (as also shown in the enlarged, schematic box diagram of FIG. **4**B), which is coupled, via the connector **108**, to the second flow channel **500**B. The second chamber **410** contains a second constituent of a haemostatic agent.

[0070] An end surface **406**A of the plunger **406** is movable along the barrel of the syringe **402** to force the constituents of the first chamber **408** and the second chamber **410** out of the respective first and second fluid outlets **414**A, **414**B.

[0071] The first and second fluid outlets **414**A, **414**B are connected to the tube **100**, via the Luer lock connector **108**, in such a manner that the first chamber **408** is in fluid communication, via the first fluid outlet **414**A, with the first flow channel **500**A of the tube **100**, and the second chamber **410** is in fluid communication, via the second fluid outlet **414**B, with the second flow channel **500**B of the tube **100**.

[0072] The first constituent is fibrinogen. The second constituent is thrombin. The two constituents, when mixed at a tip of the tube **100**, form a haemostatic agent **412**, i.e. a substance suitable for promoting wound healing or wound closure. In this example, the haemostatic agent **412** is a fibrin glue. At least one of the first constituent and the second constituent may further comprise calcium.

[0073] In another example, the first constituent is glutaraldehyde, and the second constituent is serum albumin, in particular purified bovine serum albumin. In this example, when mixed at the tip of the tube **100**, the two constituents form a glutaraldehyde-based adhesive.

[0074] In use, the syringe **402** is attached to the tube **100** using the Luer lock connector **108**. The tube **100**, before or after attachment of the syringe **402**, is inserted into the tube channel **204** of the MIS instrument **200**. The tube **100** may be held in the first configuration, shown in FIG. **3**, while the surgical tool **212** of the MIS instrument **200** is being used for a surgical procedure.

[0075] Upon the haemostatic agent being required at the surgical site, the tube **100** which is held in position in the tube channel **204** by friction between an exterior surface of the outer wall **103** of the tube **100** and an interior surface of the tube channel **204**, may be pushed into a distal direction, into the second configuration. In the second configuration, the distal end **101** of the tube **100** projects distally beyond a distal end **201** of the MIS instrument **200**, out of the distal outlet **210** of the tube channel **204**.

[0076] To facilitate precise application of the haemostatic agent **412**, the tip of the tube **100** projects beyond the distal end of the pair of jaws **212**. Once the haemostatic agent **412** has been applied, the tube **100** may be retracted into the tube channel **204**, allowing the surgical tool **212** to be used again.

[0077] As the first and second constituents are prevented from mixing before reaching the distal end **101** of the tube **100**, the haemostatic agent **412** does not occlude the tube **100**, and the process described above may be repeated, allowing haemostatic agent **412** to be repeatedly applied via the tube **100**.

[0078] It will be understood that the present disclosure has been described above purely by way of example, and modifications of detail can be made within the scope of the present disclosure.

[0079] Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination. While the disclosure has been illustrated and described in detail in the drawings and the foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. The disclosure is not limited to the disclosed embodiments. From reading the present disclosure, other modifications will be apparent to a person skilled in the art. Such modifications may involve other features, which are already known in the art and may be used instead of or in addition to features already described herein. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. Although this disclosure refers to specific embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the subject matter set forth in the accompanying claims.

1. A system for delivering a haemostatic agent, comprising:

a minimally invasive surgical (MIS) instrument comprising a tube channel; and

a tube receivable in the tube channel, the tube comprising:

a first flow channel;

a second flow channel, fluidically separated from the first flow channel; and

a connector, at a proximal end of the tube, connectable to at least two syringe outlets,

a first one of the at least two syringe outlets being connectable to the first flow channel, and a second one of the at least two syringe outlets being connectable to the second flow channel, so that efflux from the at least two syringe outlets is prevented from combining before reaching a distal end of the tube.

2. The system of claim **1**, wherein the tube when received within the tube channel is movable between a first configuration, in which a distal end of the tube is contained within the tube channel, and a second configuration, in which the distal end of the tube projects from a distal end of the tube channel.

3. The system of claim **2**, wherein the system comprises a limiter configured so that the distal end of the tube projects from the distal end of the tube channel by a distance, X.

4. The system of claim **3**, wherein the limiter is configured so that the distance X is adjustable.

5. The system of claim **4**, wherein the tube comprises the limiter, and the limiter is configured to engage with a proximal end of the tube channel upon the tube being in the second configuration.

6. The system of claim **5**, wherein the limiter comprises a flange having a diameter greater than a diameter of the tube channel.

7. The system of claim **3**, wherein the tube comprises the limiter, and the limiter is configured to engage with a proximal end of the tube channel upon the tube being in the second configuration.

8. The system of claim **7**, wherein the limiter comprises a flange having a diameter greater than a diameter of the tube channel.

9. The system of claim **8**, wherein the MIS instrument comprises, at a distal end, a surgical tool; and optionally wherein the surgical tool comprises a pair of jaws.

10. The system of claim **9**, wherein, in the second configuration, the distal end of the tube extends distally beyond the surgical tool.

11. The system of claim **1**, wherein the MIS instrument comprises, at a distal end, a surgical tool; and optionally wherein the surgical tool comprises a pair of jaws.

12. A system according claim **1**, wherein the tube is separable from the MIS instrument.

13. The system of claim **1**, wherein:

the tube channel extends substantially along a longitudinal axis of the MIS instrument; and the connector is a Luer lock connector.

14. The system of claim **1**, further comprising a syringe, the syringe comprising:

a first chamber having a first fluid outlet coupled to the first flow channel, the first chamber containing a first constituent; and

a second chamber having a second fluid outlet coupled to the second flow channel, the second chamber containing a second constituent,

wherein the first constituent and second constituent, when combined, form a haemostatic agent; and optionally wherein the first constituent comprises at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, glutaraldehyde; and wherein the second constituent comprises at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, glutaraldehyde.

15. The system of claim **1**, further comprising a tube being receivable in a tube channel of the MIS instrument and comprising:

a first flow channel;

a second flow channel, fluidically separated from the first flow channel; and

a connector, at a proximal end of the tube, connectable to at least two syringe outlets,

a first of the at least two syringe outlets being connectable to the first flow channel, and a second of the at least two syringe outlets being connectable to the second flow channel, so that efflux from the at least two syringe outlets is prevented from combining before reaching a distal end of the tube.

16. The system of claim **15**, wherein the tube comprises a limiter configured to engage with a proximal end of a tube channel of the MIS instrument; optionally wherein the tube is configured to project, distally, from a tube channel of the MIS instrument when the limiter engages a proximal end of a tube channel of the MIS instrument.

17. The system of claim **16**, wherein the limiter comprises a flange having a diameter greater than a diameter of the tube channel.

18. A kit comprising:

a tube being receivable in a tube channel of a minimally invasive surgical (MIS) instrument and including a first flow channel, a second flow channel, fluidically separated from the first flow channel, and a connector, at a proximal end of the tube, connectable to at least two syringe outlets, a first of the at least two syringe outlets being connectable to the first flow channel, and a second of the at least two syringe outlets being connectable to the second flow channel, so that efflux from the at least two syringe outlets is prevented from combining before reaching a distal end of the tube; and

a syringe including a first chamber having a first fluid outlet coupled to the first flow channel, the first chamber containing a first constituent; and a second chamber having a second fluid outlet coupled to the second flow channel, the second chamber containing a second constituent, wherein the first constituent and second constituent, when combined, form a haemostatic agent.

19. The system of claim **18**, wherein the tube comprises a limiter configured to engage with a proximal end of a tube channel of the MIS instrument; optionally wherein the tube is configured to project, distally, from a tube channel of the MIS instrument when the limiter engages a proximal end of a tube channel of the MIS instrument.

20. The kit of claim **19**, wherein the first constituent comprises at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, glutaraldehyde; and wherein the second constituent comprises at least one of: fibrinogen, aprotinin, fibronectin, plasminogen, factor XIII, thrombin, calcium, serum albumin, glutaraldehyde.

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