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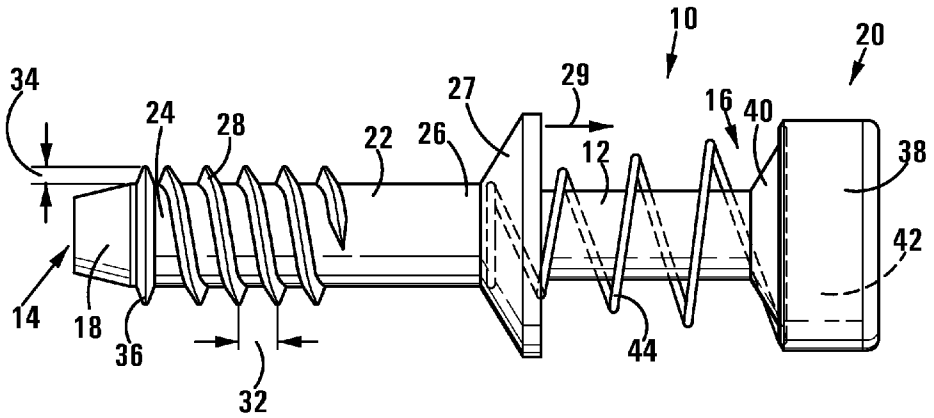
(54) **Title:** A CANNULA



(57) **Abstract:** A cannula for fixation within a portal to provide access to a surgical worksite by a surgical instrument, comprises an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end, a sealing assembly located at the upper end for sealingly receiving a surgical instrument, and a generally cylindrical sleeve surrounding and extending along at least part of the tubular body. The sleeve has a lower end which is secured to the tubular body, an upper end and an external screw thread and is of a flexible material so that stretching the sleeve in the direction of the upper end of the tubular body by displacing the tubular body and sleeve relative to each other increases the pitch and reduces the depth of the thread and relative displacement in the opposite direction reduces the pitch and increases the depth of the thread.

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A CANNULA

THIS INVENTION relates to surgical cannulas. It relates, in particular, to surgical cannulas of the type used for endoscopic surgery.

In endoscopic surgery, instruments are inserted into a patient's body through the patient's skin and superficial tissue via openings or "portals". To ensure that these portals are maintained and instruments are not passed through new portals each time an instrument is used, cannulas are used to protect the soft tissue and to maintain fluid or gas pressure inside the body. Cannulas are generally provided with seals at their upper ends which are referred to as dams. It is also important that a cannula forms a seal inside the patient's body. Conventional cannulas have various configurations to ensure such a seal and to prevent the cannula from backing out of the portal. The most common configuration is provided by large threads on the outside of the cannula. This type of cannula is screwed into the patient's body, often very tightly, to ensure good stability of the cannula and a sufficient seal.

However, it will be appreciated that screwing large threads into soft tissue is traumatic and can cause damage. Furthermore, a substantial amount of force often needs to be applied when cannulas are inserted, especially through joint capsules. The cannula is usually inserted with a trocar located inside the cannula to give stability to the cannula and, at the same time, the protruding semi-sharp tip of the trocar pushes soft tissue out of the way when the cannula is inserted. In general, the length and diameter of a cannula depends on the type of procedure which is to be conducted. Cannulas also often have to be moved inwardly and outwardly in the portal during surgery to afford better access to certain areas. In the case of screw-type cannulas, the cannula obviously has to be unscrewed or screwed in further to prevent damage to the soft tissue. However, tubes are usually attached to the cannula for either inflation or suction and these then have to be removed to facilitate rotation of the cannula. Cannulas are therefore often fitted with stopcocks to prevent leakage. The Applicant is aware of US

6,808,492 which discloses a cannula having a flexible sleeve with corrugations and a proximal flange which is slidably attached to the cannula. When the flange is pulled, the sleeve is stretched and the outer diameter of the corrugations is reduced allowing easier insertion and movement of the sleeve. When the flange is released, the corrugations expand to create a seal against the tissue surrounding the portal in the patient. The present invention provides a cannula which the Applicant believes is an improvement on the cannula of US 6,808,492 for use in endoscopic surgery.

Broadly, the invention provides a cannula for use in endoscopic surgery, the cannula comprising an elongate body having an adjustable external screw thread, and adjustment means for adjusting the thread between a deployed state in which the thread depth is sufficient to engage with soft tissue and an undeployed state in which the thread depth is substantially reduced or the thread is essentially absent so that it does not engage with soft tissue.

More particularly, according to a first aspect of the invention, there is provided a cannula for fixation within a portal to provide access to a surgical worksite by a surgical instrument, the cannula including

an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

a sealing assembly located at the upper end for sealingly receiving a surgical instrument, and

a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body, an upper end and an external screw thread, the sleeve being of a flexible material so that stretching the sleeve in the direction of the upper end of the tubular body by displacing the tubular body and sleeve relative to each other increases the pitch and reduces the depth of the thread and relative displacement in the opposite direction reduces the pitch and increases the depth of the thread.

Thus, relative movement of the sleeve and the tubular body will allow a user selectively to increase and decrease the pitch and depth of the thread. Preferably, the flexible material will be such that, when the sleeve is stretched sufficiently, the depth of

the thread is so small that the thread is effectively no longer present and the sleeve is effectively smooth.

Preferably, the flexible material will be manufactured with a memory so that, after being stretched and released, it automatically returns to its unstretched state in which the thread is deployed.

In an alternative embodiment of the invention the flexible material is manufactured with a memory so that, in its unstretched state, the thread is undeployed and the surface of the sleeve is effectively smooth and, by compressing the sleeve in the direction of the lower end of the tubular body, the thread is deployed.

The sleeve may, further, be provided with a sealing collar at or adjacent its lower end which is also deployed when the sleeve is in an unstretched or compressed state and collapsed when the sleeve is stretched. Thus, when the sleeve is stretched in the direction of the upper end, the diameter of the collar will be reduced in the same way as the depth of the thread is reduced. In this way, the sealing collar will also be collapsed by stretching the sleeve and deployed by compressing the sleeve or by allowing the sleeve to automatically revert to its unstretched state.

The cannula may include a locking mechanism for selectively locking the sleeve in a desired position.

The sleeve may be provided with an engagement member such as a flange, collar or handle formation at or adjacent its upper end to aid in manually displacing the sleeve and tubular body relative to one another.

The cannula may thus be used syringe-fashion with the first two fingers of a user engaged with the flange, collar or handle formation and the thumb of the user engaged with the sealing assembly so that displacing the fingers and thumbs towards each other will stretch the sleeve to undeploy, or collapse, the thread and seal and displacing them away from each other will compress the sleeve or allow the sleeve to automatically revert to its unstretched state to deploy the thread and seal.

The cannula may include biasing means biasing the sleeve away from the upper end of the tubular body into its compressed, or unstretched, state. The biasing means may be in the form of a spring in compression, located between the engagement member and the sealing assembly, and operable to bias the sleeve towards its compressed or unstretched state.

In a preferred embodiment of the invention, the cannula is provided with a displacement member for stretching and compressing the sleeve, the displacement member being rotatably engaged with the sleeve, and the displacement member and the tubular body having complimentary screw threads and being screw-threadedly engaged, so that rotation of the displacement member in one direction displaces the displacement member longitudinally in the direction of the lower end of the tubular body to deploy the thread and rotation in the opposite direction displaces it longitudinally in the direction of the upper end to stretch the sleeve and undeploy the thread.

In this embodiment, the displacement member will be slidably connected to the sleeve so that the displacement member can be rotated without twisting the sleeve.

The screw threads will preferably have a large pitch so that relatively small rotations of the displacement member produce relatively large longitudinal displacements of the displacement member so that stretching or compressing the sleeve can be achieved with relatively small rotational movements of the displacement member.

In this embodiment of the invention, instead of being used syringe-fashion, the displacement member is simply rotated to deploy and undeploy the thread of the sleeve.

According to another aspect of the invention, there is provided a cannula for fixation within a portal to provide access to a surgical worksite by a surgical instrument, the cannula including

an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

a sealing assembly located at the upper end for sealingly receiving a surgical instrument, and

a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body and an upper end, the sleeve being of a flexible material having a memory so that compressing the sleeve in the direction of the lower end of the tubular body by displacing the tubular body and sleeve relative to each other deploys an external screw thread, and allowing the sleeve to return to its uncompressed state undeploys the thread.

The sleeve may be provided with a sealing collar at or adjacent its lower end which is deployed when the sleeve is compressed and collapsed when the sleeve is allowed to return to its uncompressed state. The cannula may include a locking mechanism for selectively locking the sleeve in a desired position. The sleeve may be provided with an engagement member at or adjacent its upper end to aid in manually displacing the sleeve and tubular body relative to one another.

The cannula may be provided with a displacement member for displacing the sleeve and tubular body relative to one another, the displacement member being rotatably engaged with the sleeve, and the displacement member and the tubular body having complimentary screw threads and being screw-threadedly engaged, so that screw-threaded rotation of the displacement member in one direction displaces the displacement member longitudinally in the direction of the lower end of the tubular body to deploy the thread and rotation in the opposite direction displaces it longitudinally in the direction of the upper end to undeploy the thread.

In use, the cannula of the invention is used with a trocar with the thread collapsed so that it glides more smoothly through the portal without damage to the tissue. When the tip of the cannula is at a desired depth, the thread and sealing collar are deployed by compressing the sleeve towards the lower end of the tubular body, or allowing it to automatically revert to is unstretched state, either by displacing the collar

or rotating the displacement member. The surgeon can then slightly rotate the cannula counter clockwise in an "unscrewing" direction so that the deployed seal seals against the inside of the body cavity and the threads engage with soft tissue. If the surgeon wishes to change the depth of the cannula the thread and seal are collapsed by stretching the sleeve in the direction of the upper end of the tubular body or allowing it to revert to its uncompressed state as described above, the cannula is shifted and the thread and seal are redeployed.

The tubular body and sleeve of the invention will preferably be made of transparent materials so that a surgeon can see into the cannula.

In practice, it has been found that expanding the thread is generally achieved by withdrawing the tubular part of the cannula rather than by pushing the sleeve forwards.

The invention thus provides a cannula which has a soft deformable screw thread that can be expanded or collapsed as required thereby overcoming the disadvantages of prior art cannulas which are provided with permanent screw threads.

According to another aspect of the invention there is provided a method of using a cannula in an endoscopic surgical procedure, the method including the steps of

providing a cannula having an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

providing a sealing assembly at the upper end for sealingly receiving a surgical instrument,

providing a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body, an upper end and an external screw thread, the sleeve being of a flexible material so that stretching the sleeve in the direction of the upper end of the tubular body by displacing the tubular body and sleeve relative to each other increases the pitch and reduces the depth of the thread and relative displacement in the opposite direction reduces the pitch and increases the depth of the thread,

providing the sleeve with an engagement or displacement member for manually displacing the sleeve and tubular body relative to one another,

manually displacing the sleeve with the engagement or displacement member to stretch the sleeve to reduce the depth of the thread,

inserting the cannula via a portal into a patient, and

manually displacing the sleeve with the engagement or displacement member in the opposite direction to deploy the thread to secure the cannula in the portal.

The invention extends to a method of using a cannula in an endoscopic procedure, the method including the steps of

providing a cannula having an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

providing a sealing assembly at the upper end for sealingly receiving a surgical instrument,

providing a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body and an upper end, the sleeve being of a flexible material having a memory so that compressing the sleeve in the direction of the lower end of the tubular body by displacing the tubular body and sleeve relative to each other deploys an external screw thread and allowing the sleeve to return to its uncompressed state undeploys the thread,

providing the sleeve with an engagement or displacement member for manually displacing the sleeve and tubular body relative to one another,

inserting the cannula via a portal into a patient, and

manually displacing the sleeve with the engagement or displacement member to deploy the thread to secure the cannula in the portal.

The invention is now described, by way of example, with reference to the following diagrammatic drawings, in which

Figure 1 shows a three dimensional side view of a cannula in accordance with the invention with its thread in a deployed state;

Figure 2 shows a three dimensional side view of the cannula of Figure 1 with its thread partly deployed;

Figure 3 shows a three dimensional side view of the cannula of Figure 1 with its thread in an undeployed state;

Figure 4 shows a sectional side view of another embodiment of a cannula in accordance with the invention with its thread in a deployed state;

Figure 5 shows a fragmentary view of the cannula of Figure 4 with its thread in an undeployed state;

Figure 6 shows a fragmentary view of another embodiment of a cannula in accordance with the invention;

Figures 7 and 8 show, respectively, a three-dimensional view and a side view of another embodiment of a cannula in accordance with the invention;

Figure 9 shows part of the cannula of Figures 7 and 8; and

Figure 10 shows a sectional side view of part of another embodiment of a cannula in accordance with the invention.

Referring to the drawings, reference numeral 10 generally indicates a cannula in accordance with the invention. The cannula 10 includes an elongate tubular body 12 defining a passage 14 for receiving a surgical instrument (not shown). The tubular body 12 has an upper end 16 and a tapering lower end 18. A sealing assembly of the conventional type used with cannulas, generally indicated by reference numeral 20, is located at the upper end 16.

A generally cylindrical sleeve 22, having a lower end 24 and an upper end 26, surrounds and extends along the tubular body 12 from a position adjacent the tapering lower end 18 of the tubular body 12 to a position near to its upper end 16. The lower end 24 of the sleeve 22 is secured to the tubular body 12 and the upper end 26 of the sleeve 22 is provided with a sliding collar or flange 27.

The sleeve 22 is of a flexible synthetic polymeric material so that it can be stretched in the direction of the arrow 29 and compressed in the opposite direction.

The sleeve 22 has an external screw thread 28 and, because the sleeve is made of a flexible material, stretching the sleeve 22 in the direction of the arrow 29 increases the pitch, as shown by the arrows 32 in Figures 1, 2 and 3, and reduces the depth of the thread 28, as shown by the arrows 34 in Figures 1, 2 and 3, and compressing the sleeve in the opposite direction reduces the pitch 32 and increases the depth 34 of the thread 28.

The sleeve 22 is provided with a sealing collar 36 adjacent its lower end 24. The sealing collar 36 also reduces in diameter as the sleeve 22 is stretched in the direction of the arrow 29 as can be seen in Figures 1, 2 and 3. The sealing collar 36 is accordingly also deployed and undeployed by, respectively, compressing the sleeve 22 or stretching it.

In a variation of this embodiment of the invention, the sleeve 22 is manufactured so that in an unstretched or uncompressed state, ie. in a relaxed state, the thread 28 is largely or completely absent, but compressing the sleeve 28 in the direction of the lower end 18 deploys the thread 28. In this embodiment the tendency of the sleeve will thus be to revert to a state in which the thread 28 is undeployed.

The sealing assembly 20 is of the conventional type commonly used to seal cannulas and comprises a cylindrical collar 38 with an inwardly tapering portion 40, mounted on the upper end 16 of the tubular body 12 and provided with a flexible seal 42. The seal 42 is of a soft deformable synthetic polymeric material and is provided with a cross-shaped slit (not shown) in conventional fashion for sealingly receiving a trocar and the surgical instruments (both not shown) used in a particular surgical procedure.

A coil spring 44, in compression, is positioned between the sealing assembly 20 and the flange 27 so that it biases the sleeve 22 in the opposite direction to that of the arrow 29 towards its compressed state in which the pitch of the thread 28 is reduced and its depth is increased as shown in Figure 1. The cannula 10 is optionally provided with an adjustable locking mechanism, (not shown) to adjustably lock the position of the tubular body 12 relative to the sleeve 22 in a preferred position for a specific surgical procedure or a specific step in a surgical procedure.

Referring now to Figures 4 and 5, reference numeral 50 generally indicates another embodiment of a cannula in accordance with the invention. The cannula 50 resembles the cannula 10 of Figures 1, 2 and 3 and the same numbers have been used to indicate the same or similar features of the cannulas 50 and 10.

The cannula 50 differs from the cannula 10 in that an outlet 52 is provided in the tapering portion 40 of the collar 38. The outlet 52 will typically be provided with a stopcock or valve (not shown). In this embodiment of the invention, the seal, generally indicated by reference numeral 54, includes an upper disk 56 and a lower disk 58 each of a soft deformable synthetic polymeric material and separated from one another by an O-ring 60. Each disk 56, 58 is provided with a cross-shaped slit in conventional fashion (not shown) through which a trocar or surgical instrument can be inserted in conventional fashion. The cannula 50 is also optionally provided with an adjustable "click" locking mechanism (not shown) to lock the flange 27 in a desired position. In Figure 5, the cannula 50 is shown with the flange 27 displaced towards the sealing assembly so that the thread 28 and seal 36 are effectively flattened.

Referring now to Figure 6, reference numeral 70 generally indicates another embodiment of a cannula in accordance with the invention. The cannula 70 resembles the cannula 20 of Figures 4 and 5 and the same numbers have been used to indicate the same or similar features of the cannulas 70 and 20.

The cannula 70 differs from the cannula 20 in that the outlet 52 is absent and the collar 38 is provided with two downwardly directed flexible extensions 72 which are provided with half arrow-head shaped clip formations 74 at their ends. The sliding collar 27 is provided with openings 76 so that, when the collar 27 is pulled upwardly in the direction of the arrow 29 the clip formations 74 pass through the openings 76 and because of the flexibility of the extensions 72, the clip formations 74 engage with the collar 27 and lock the collar 27 in position with the thread 28 in its extended, undeployed state. The collar 27 can be released by flexing the extensions 72 inwardly so that the clip formations 74 disengage from the collar 27. Accordingly, in this embodiment of the invention, the thread of the cannula 70 can be locked in its undeployed state.

Referring now to Figures 7-9, reference numeral 90 generally indicates another embodiment of a cannula in accordance with the invention. The cannula 90 resembles the cannula 50 of Figures 4 and 5 and the same numbers have been used to indicate the same or similar features of the cannulas 90 and 50.

The cannula 90 differs from the cannula 50 in that the sleeve 25 is provided with a collar 92 at its upper end 26 and the tubular body 12 is provided with a screw-thread 94 positioned near its upper end 16. A displacement member 96 is screw-threadedly engaged with the thread 94. The displacement member 96 comprises a cylindrical nut 98 and two outwardly projecting flanges 100 so that the displacement member 96 resembles a wing nut. In other embodiments of the invention (now shown) the displacement member 96 is cylindrical or wheel-shaped and is optionally provided with serrations or the like to aid in gripping and turning the displacement member 96. The collar 92 and the displacement member 96 are slidably engaged so that the displacement member 96 can be screw-threadedly rotated without twisting the sleeve 22. For example, in the embodiment of the invention shown in Figure 10 (in which the same members have been used to indicate the same or similar features of the cannula 90), the collar 92 is provided with an outer annular recess 102 and the displacement member 96 is provided with a collar 104 with a complimentary annular ridge 106, the ridge 106 being slidably received in the recess 102, so that rotation of the displacement member 96 to displace it towards the upper end 16 of the turbular body 12 will stretch the sleeve 22 and rotation in the opposite direction will displace the collar 92 in the opposite direction to compress the sleeve 22. Naturally any other suitable slidable link between the displacement member 96 and the sleeve 22 can be used. The thread 94 has a large pitch so that relatively small rotations of the displacement member 96 causes relatively large longitudinal displacement of the member 96 to compress or extend the sleeve 22 in order to deploy the thread 28 and sealing collar 36. The pitch of the thread 94 will typically be selected so that less than one rotation of the displacement member 96 will be sufficient to deploy and undeploy the thread 28 and sealing collar 36.

In use the cannula 10, 50, 70 or 90 is used with a trocar (not shown) with the thread 28 in a collapsed state as shown in Figures 3 and 5. In this state, because the

seal 36 and thread 28 have been stretched and substantially flattened to the extent that the thread 28 and seal 36 are all but absent, the cannula glides much more smoothly through the portal without damage to the tissue. When the tip of the cannula 10, 50 or 70 is at a desired depth, the surgeon allows the spring 44 to urge the flange 27 in the direction opposite to that of the arrow 29 so that the thread 28 and seal 36 become deployed as shown, for example, in Figures 4 and 1. In the case of the cannula 90 deployment of the thread 28 and seal 36 is achieved by rotation of the displacement member 96 as described above. The surgeon can then rotate the cannula 10, 50, 70 or 90 in a counter-clockwise direction to slightly "unscrew" the cannula 10, 50, 70 or 90 so that the thread 28 and seal 36 engage with the tissue of the portal to ensure a good seal. In order to change the depth of the cannula 10, 50, 70 or 90 the surgeon will again displace the flange 27 in the direction of the arrow 29 (or displace the tubular body 12 forwardly) or rotate the displacement member 96 so that the thread 28 and seal 36 collapse. The cannula 10, 50, 70 or 90 can then be moved further in or withdrawn slightly and the thread 28 and seal 36 again deployed.

It is an advantage of the cannula of the invention that the use of the cannula is atraumatic. This is because the cannula can be inserted without screwing it into the soft tissue, the thread is made of a soft material and the cannula can be reset and repositioned without screwing as is the case with prior art cannulas. Inserting the cannula is accordingly much easier and faster then is the case with prior art cannulas. Furthermore, the seal between the cannula and the tissue is improved as the pitch of the thread changes during deployment by capturing soft tissue between the threads. The cannula of the invention is also less prone to falling out of the portal due to the seal creating a buttress. Resetting the cannula of the invention is also faster. It is a further advantage of the invention illustrated that, if an inflow or suction tube is connected to the outlet 52, the position of the cannula 50 can be adjusted without having to "unscrew" the cannula as in the case of prior art cannulas which are provided with rigid threads. It is accordingly then not necessary to disconnect the inflow or suction tube as is required with conventional cannulas having rigid threads. The cannula of the invention can be used for any endoscopic application and is particularly suitable for shoulder arthroscopy.

During arthroscopic surgery a specially Bankart or similar repairs for instability, it is often necessary to adjust the depth of the cannula protruding into the joint. This can be critical if the inside orifice of the cannula has to be near the capsule. This means that the cannula must not protrude into the joint, but must not be outside the capsule either. It has to lie at the capsule are itself. With the ribbed design of US 6,808,492, this is difficult to achieve. The ribs have to be flattened by pulling on the outer sleeve and pulling the entire cannula outwards and then releasing the outer sleeve so that the ribs are opened. In practice, this is not satisfactory. When the ribs are deployed, the inner tube of the cannula is pulled outwardly. The cannula orifice will then often be lying outside the capsule and precise setting is accordingly difficult. The threaded cannula of the invention allows a surgeon to "unscrew" the cannula with the thread still deployed and therefore obtain a more accurate placement of the cannula. The cannula can be screwed in or out as needed. For larger movements in and out of the joint, the thread is flatted by the surgeon and re-deployed in the desired position.

In arthroscopic surgery it is mandatory to have a positive pressure of fluid inside the joint to keep the joint extended so that there is space to work in. When the cannula of the invention is unscrewed away from the joint, the sealing collar at or adjacent the lower end is deployed and abuts against the capsule of the joint thereby making amore effective seal against leakage of fluid pumped into the joint and helps to maintain constant pressure inside the joint.

The cannula of US 6,808,492 has a ribbed structure even when the sleeve is stretched and does not adopt the completely smooth appearance of the cannula of the invention. In some procedures a surgeon prefers to have a smooth cannula that will move in and out with the instrument which he placed into the cannula. This is particularly applicable in subacromial surgery. Subacromially there is no capsule and the cannula is inserted through skin and deltoid muscle. Surgery in this area requires instruments such as shavers and burrs to be placed deep into the surgery area or conversely very close to the deltoid muscle. Such movements are not achievable with the ribbed design of US 6,808,492. The cannula of the invention can be made smooth so that the surgeon can push it deeper or pull it back at will. If the surgeon needs to stabilise the cannula he simply deploys the thread. In particular, the embodiment in the

invention depicted in Figures 7-9 allows the surgeon to easily control the size of the thread depending upon the type of tissue into which the cannula has been inserted. In soft tissue such as muscle a larger thread is generally desirable and in more rigid tissue a smaller thread diameter is generally all that is needed. The prior art ribbed cannula of US 6,808,492 has one rib following directly on the other and there are no flat areas between the ribs. This structure tends to push tissue further away from the cannula and thus, in turn, requires a larger opening for the cannula to lie in. There is very little room for tissue to lie between the ribs. The threaded cannula of the invention, on the other hand, has flat areas between the threads which allow for a smaller diameter opening or portal in the tissue and this, in turn, is less traumatic to the patient.

CLAIMS

1. A cannula for use in endoscopic surgery, the cannula comprising an elongate body having an adjustable external screw thread, and adjustment means for adjusting the thread between a deployed state in which the thread depth is sufficient to engage with soft tissue and an undeployed state in which the thread depth is substantially reduced or the thread is essentially absent so that it does not engage with soft tissue.

2. A cannula for fixation within a portal to provide access to a surgical worksite by a surgical instrument, the cannula including

an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

a sealing assembly located at the upper end for sealingly receiving a surgical instrument, and

a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body, an upper end and an external screw thread, the sleeve being of a flexible material so that stretching the sleeve in the direction of the upper end of the tubular body by displacing the tubular body and sleeve relative to each other increases the pitch and reduces the depth of the thread and relative displacement in the opposite direction reduces the pitch and increases the depth of the thread.

3. A cannula as claimed in claim 2, in which the flexible material is manufactured with a memory so that, after being stretched and released, it automatically returns to its unstretched state in which the thread is deployed.

4. A cannula as claimed in claim 2 or claim 3, in which the sleeve is provided with a sealing collar at or adjacent its lower end which is deployed when the sleeve is unstretched and collapsed when the sleeve is stretched.

5. A cannula as claimed in any one of claims 4 to 7, inclusive, which includes a locking mechanism for selectively locking the sleeve in a desired position.

6. A cannula as claimed in claim 2 or claim 3, in which the sleeve is provided with an engagement member at or adjacent its upper end to aid in manually displacing the sleeve and tubular body relative to one another.

7. A cannula as claimed in any one of claims 2 to 6, inclusive, which includes biasing means biasing the sleeve away from the upper end of the tubular body.

8. A cannula as claimed in claim 6, in which the biasing means is in the form of a spring in compression, located between the engagement member and the sealing assembly.

9. A cannula as claimed in any one of claims 2 to 5, inclusive, which is provided with a displacement member for displacing the sleeve and tubular body relative to one another, the displacement member being rotatably engaged with the sleeve, and the displacement member and the tubular body having complimentary screw threads and being screw-threadedly engaged, so that screw-threaded rotation of the displacement member in one direction displaces the displacement member longitudinally in the direction of the lower end of the tubular body to deploy the thread and rotation in the opposite direction displaces it longitudinally in the direction of the upper end to stretch the sleeve and undeploy the thread.

10. A cannula for fixation within a portal to provide access to a surgical worksite by a surgical instrument, the cannula including

an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

a sealing assembly located at the upper end for sealingly receiving a surgical instrument, and

a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body and an upper end, the sleeve being of a flexible material having a memory so that compressing the sleeve in the direction of the lower end of the tubular body by displacing the tubular body and sleeve relative to each other deploys an external screw thread, and allowing the sleeve to return to its uncompressed state undeploys the thread.

11. A cannula as claimed in claim 10, in which the sleeve is provided with a sealing collar at or adjacent its lower end which is deployed when the sleeve is compressed and collapsed when the sleeve is allowed to return to its uncompressed state.

12. A cannula as claimed in Claim 10 or Claim 11, which includes a locking mechanism for selectively locking the sleeve in a desired position.

13. A cannula as claimed in any one of Claims 10 to 12, inclusive, in which the sleeve is provided with an engagement member at or adjacent its upper end to aid in manually displacing the sleeve and tubular body relative to one another.

14. A cannula as claimed in any one of Claims 10 to 13, inclusive, which is provided with a displacement member for displacing the sleeve and tubular body relative to one another, the displacement member being rotatably engaged with the sleeve, and the displacement member and the tubular body having complimentary screw threads and being screw-threadedly engaged, so that screw-threaded rotation of the displacement member in one direction displaces the displacement member longitudinally in the direction of the lower end of the tubular body to deploy the thread and rotation in the opposite direction displaces it longitudinally in the direction of the upper end to undeploy the thread.

15. A method of using a cannula in an endoscopic procedure, the method including the steps of

providing a cannula having an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

providing a sealing assembly at the upper end for sealingly receiving a surgical instrument,

providing a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body, an upper end and an external screw thread, the sleeve being of a flexible material so that stretching the sleeve in the direction of the upper end of the tubular body by displacing the tubular body and sleeve relative to each other increases the pitch and

reduces the depth of the thread and relative displacement in the opposite direction reduces the pitch and increases the depth of the thread,

providing the sleeve with an engagement or displacement member for manually displacing the sleeve and tubular body relative to one another,

manually displacing the sleeve with the engagement or displacement member to stretch the sleeve to reduce the depth of the thread,

inserting the cannula via a portal into a patient, and

manually displacing the sleeve with the engagement or displacement member in the opposite direction to deploy the thread to secure the cannula in the portal.

16. A method of using a cannula in an endoscopic procedure, the method including the steps of

providing a cannula having an elongate tubular body defining a passage for receiving a surgical instrument, the tubular body having an upper end and a lower end,

providing a sealing assembly at the upper end for sealingly receiving a surgical instrument,

providing a generally cylindrical sleeve surrounding and extending along at least part of the tubular body, the sleeve having a lower end which is secured to the tubular body and an upper end, the sleeve being of a flexible material having a memory so that compressing the sleeve in the direction of the lower end of the tubular body by displacing the tubular body and sleeve relative to each other deploys an external screw thread and allowing the sleeve to return to its uncompressed state undeploys the thread,

providing the sleeve with an engagement or displacement member for manually displacing the sleeve and tubular body relative to one another,

inserting the cannula via a portal into a patient, and

manually displacing the sleeve with the engagement or displacement member to deploy the thread to secure the cannula in the portal.

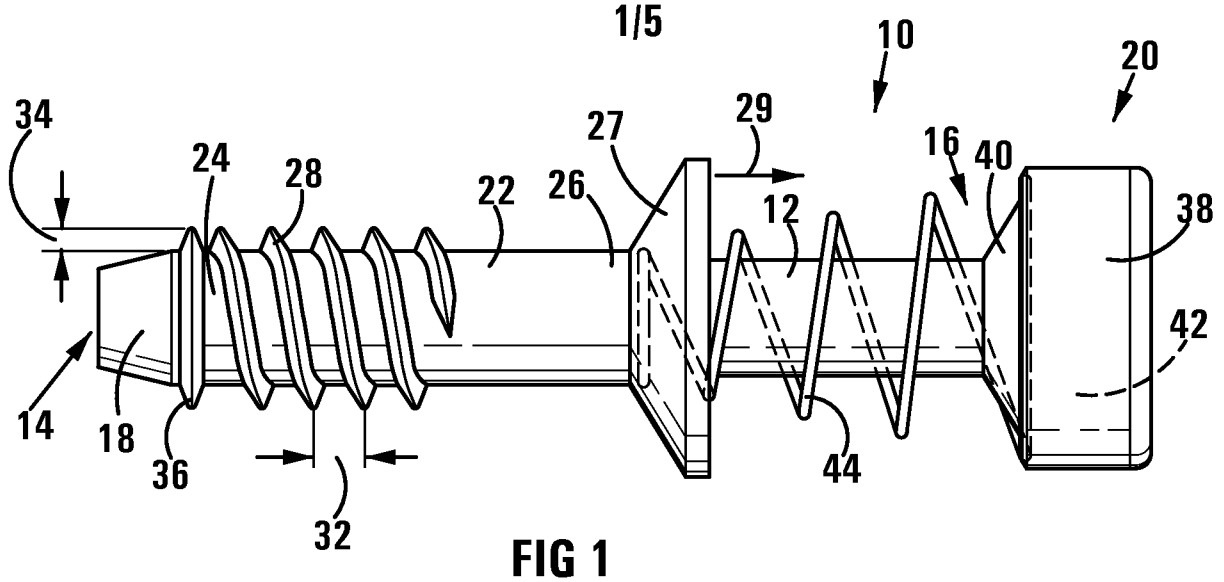


FIG 1

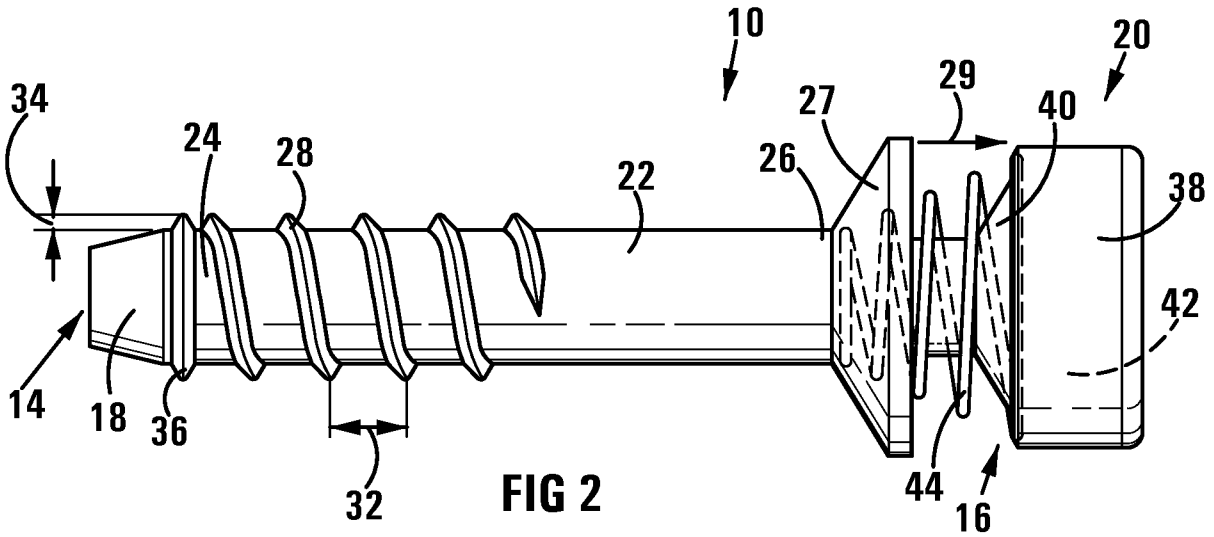
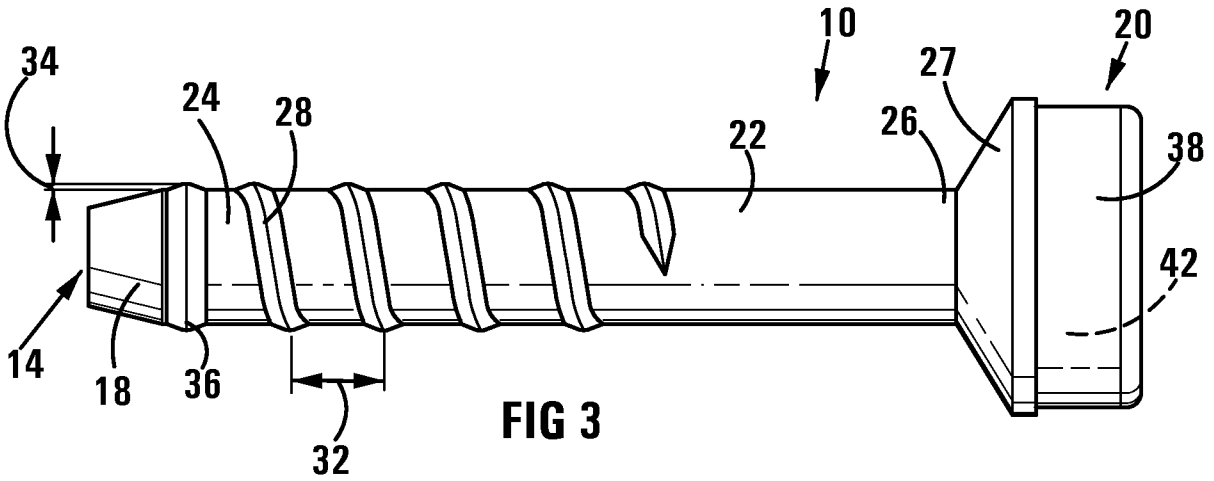


FIG 2



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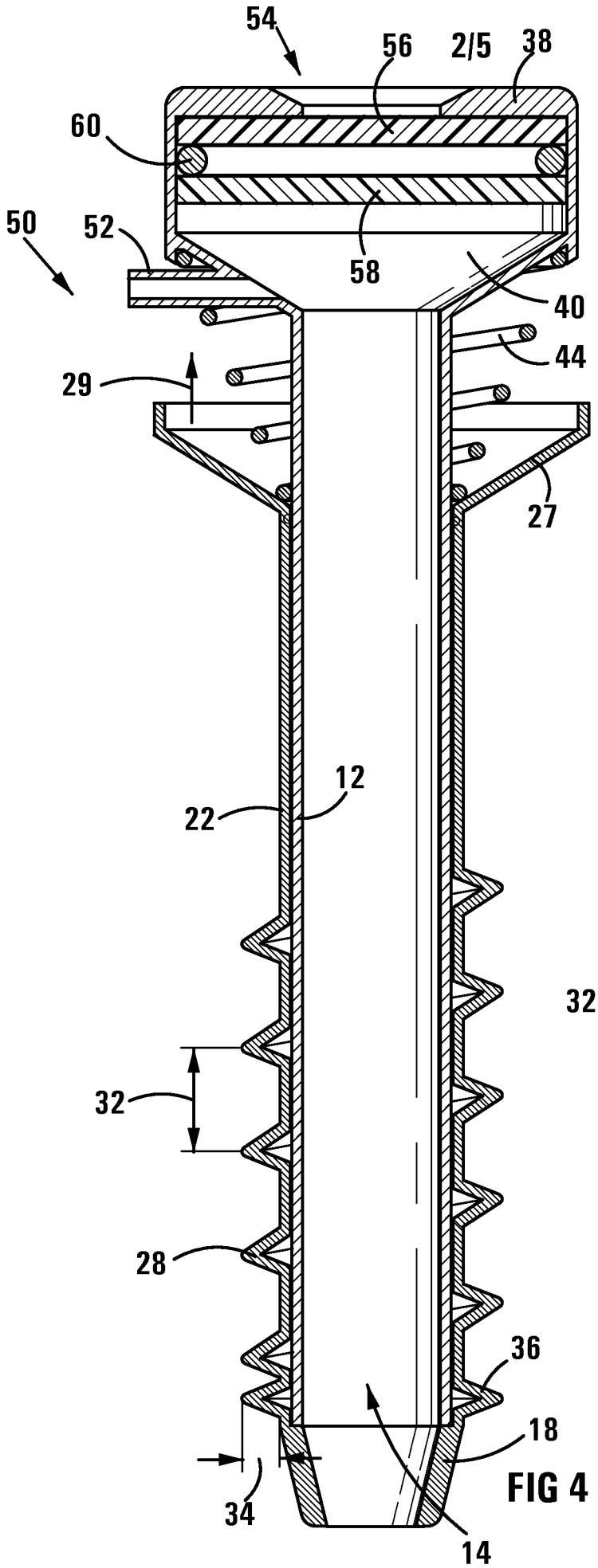
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FIG 4

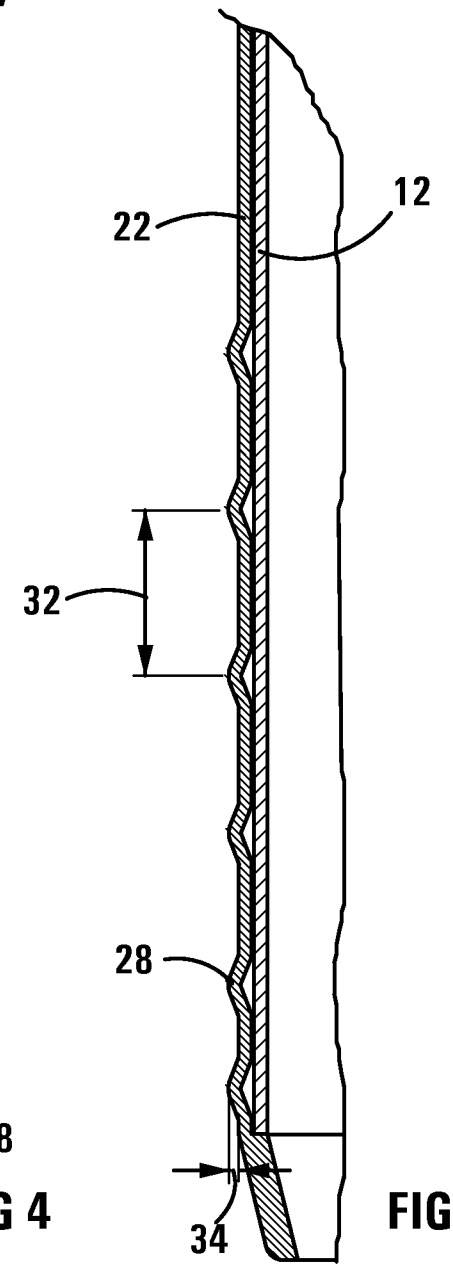
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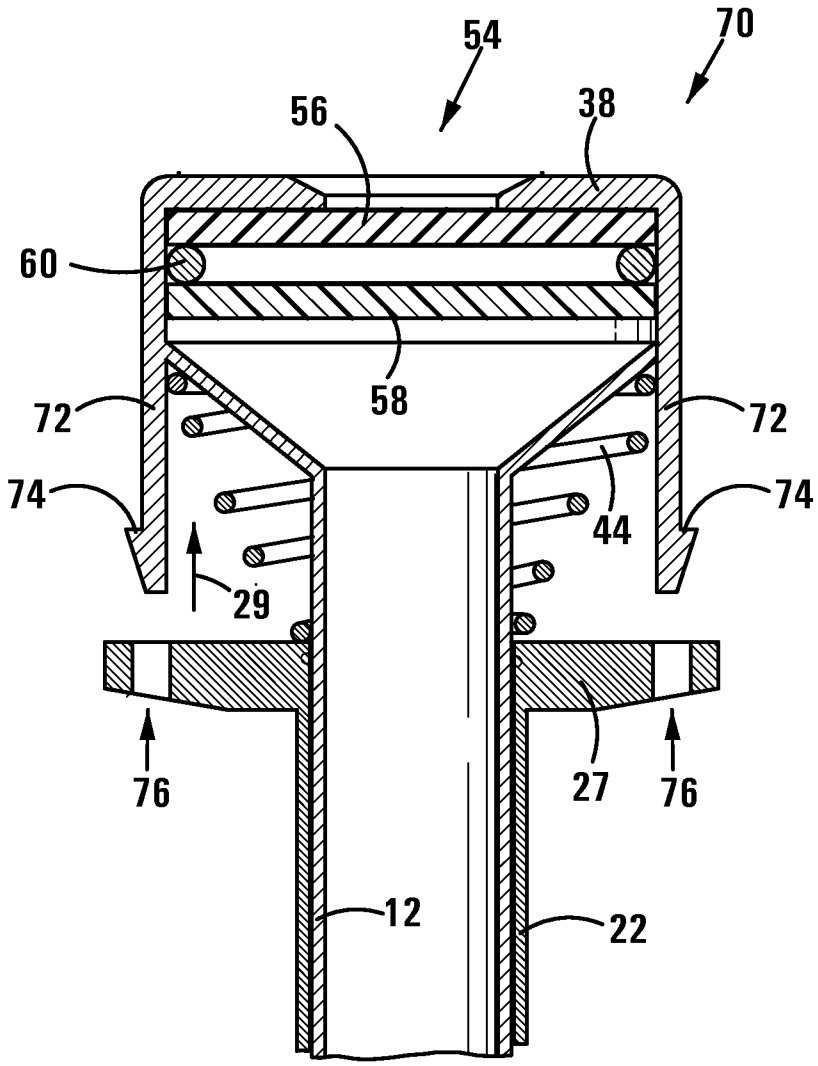
FIG 5



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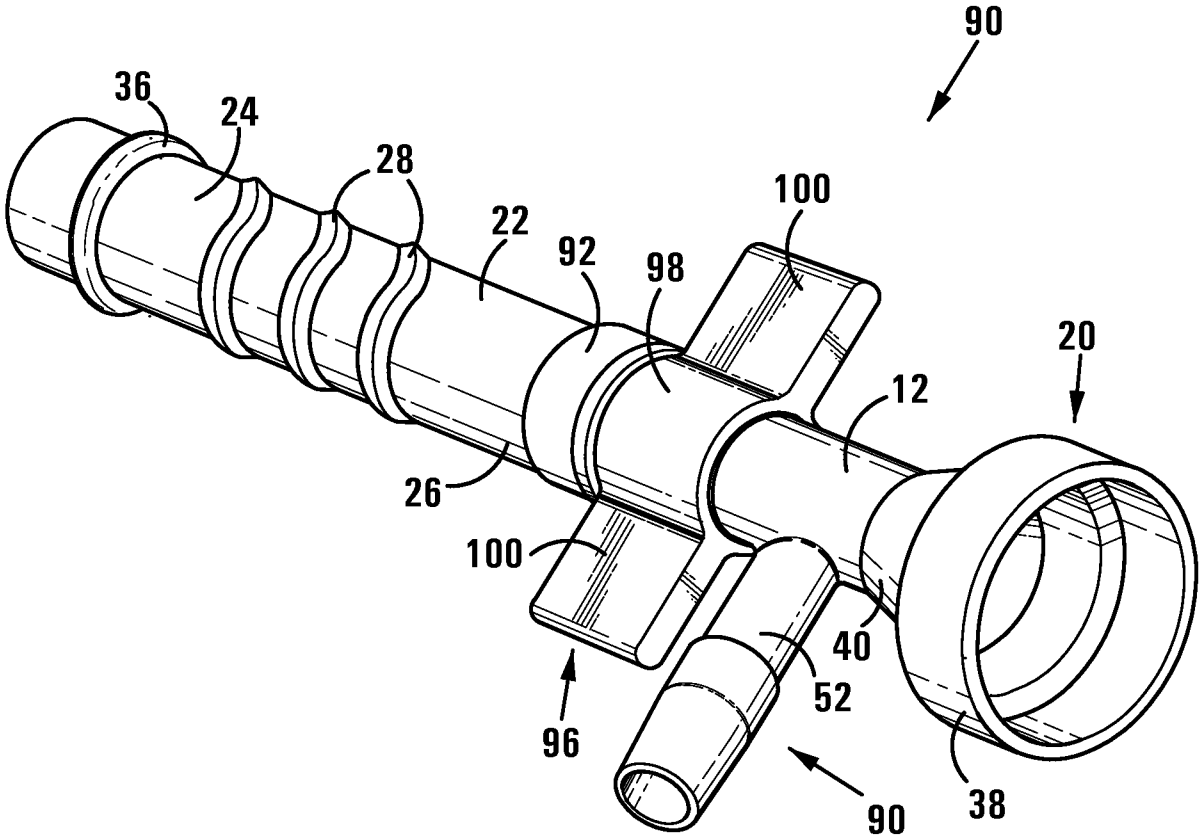
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FIG 7

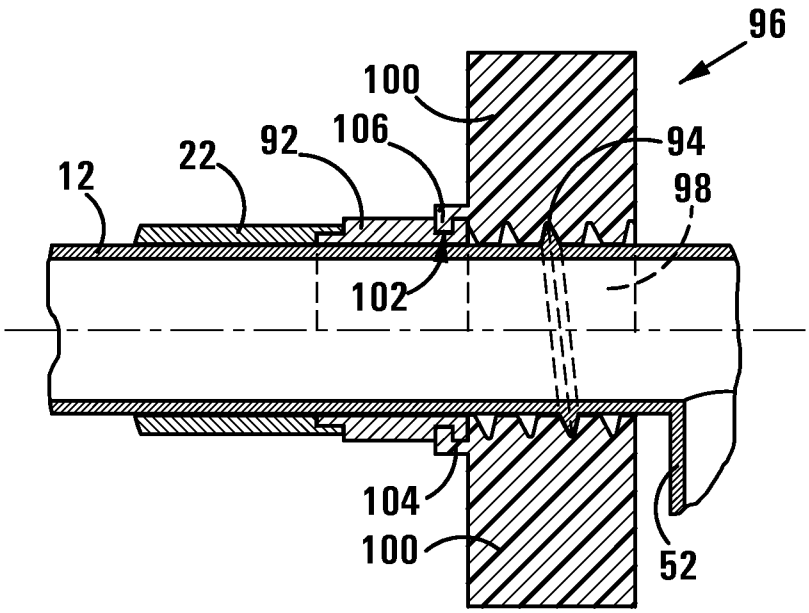
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FIG 10

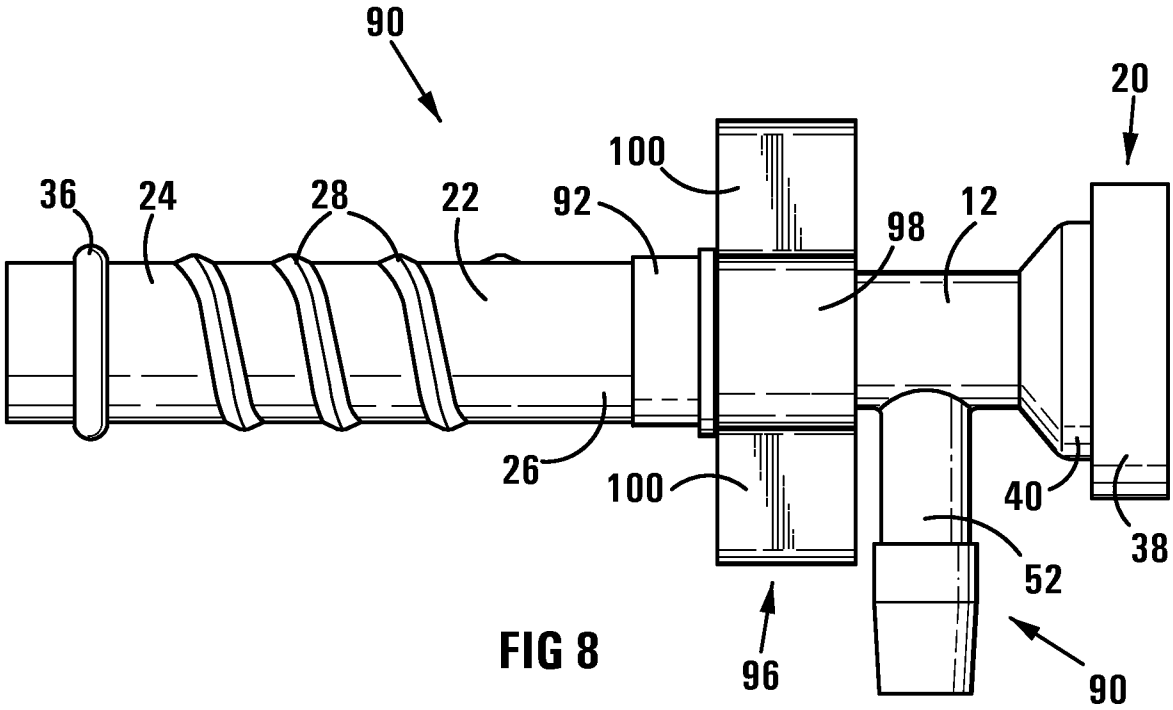
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FIG 8

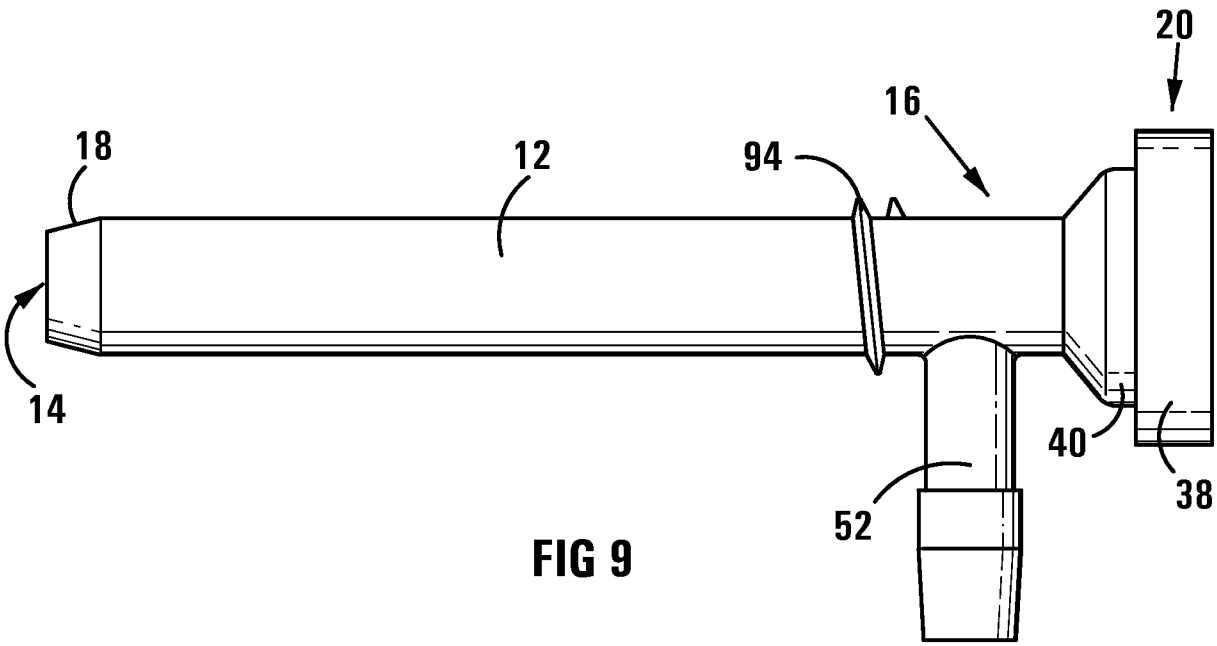
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FIG 9