Claims

1. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, comprising:

a continuum structure in the form of a tubular member

the tubular member having a proximal end and a distal end and at least two sections;

the distal end being suitable for being fitted with a surgical end effector;

the tubular member being made of a resilient material;

a respective number of wires extending inside the tubular member from the proximal end;

each wire affixed to the distal end of each section, the distal end of the most distal section being the distal end of the tubular member;

each section capable of having a curvature lengthwise of the tubular member such that the curvature of each section is changed when the distal end of each section is pulled on by the respective wire; wherein

the resilience of the material providing the tubular member with a bias such that the curvature change of each section is reversed when the pull on the distal end is released; and

the change of curvature of each of the at least two sections lies in a different plane.

2. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 1, wherein

the tubular member has a first side and a second side along an axis of the tubular member;

the first side being more compressible than the second side;

wherein

the side of the tubular member that the wire is attached is the first side; and

a pull on the wire compresses the first side to change the curvature of the tubular member.

3. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 2, further comprising

gaps in the first side to provide the compressibility of the first side; wherein

the pull of the wire changes the curvature of the tubular member by bringing gaps closer and bending the second side towards the first side.

4. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 3, further comprising

wire guides inside the tubular member for guiding the translation of the wire.

5. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in any one of claims 2 to 4, wherein

the tubular member is curved in a rest state, such that there is a concave side and a convex side to the tubular member; and

the convex side of the tubular member being the first side.

6. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 5, wherein

the tubular member is a tubular coil of spiralling loops providing two sections;

the curvature of the tubular member being such that the edges of the loops on the first side are spaced apart to provide the gaps; and

the edge of each of the loops on the second side abutting the edge of each adjacent loop; wherein

the first side and the second side are on opposite sides of the tubular member.

7. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 6, wherein

the loops have different spiral pitches and/or spacing variations along different parts of the steerable arm, in order to provide the different parts with different flexibility.

8. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 6, wherein

the loops are produced by at least one spiral cut made to a tube.

9. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 6, further comprising

at least a slit in the edge of at least one of the loops on the second side.

10. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 1, wherein

the steerable arm is placed at the distal end of a transmission tube;

the transmission tube containing a channel in which the wire is threaded;

the proximal end of the wires connected to knobs and/or levers for pulling on the wire; such that

the curvature changes when the distal end of the tubular member is pulled on by the wire at the proximal end of the transmission tube.

11. A steerable arm for fitting into the instrument channel of an endoscope for use in endoscopic surgical procedures, as claimed in claim 1, wherein the surgical end effector is forceps, diathermy knife, injection needle, suturing tool.