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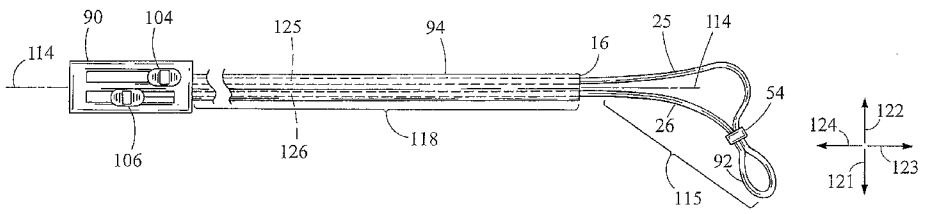
(54) Title: ARTICULATING STEERABLE WIRE GUIDE



(57) Abstract: A steerable wire guide comprises first and second members interconnected to form a unitary composite structure. The members slide relative to each other such that the leading portion of the composite structure bends in a first or second direction. The composite structure comprises a soft body portion at its distal end and a rigid body portion at its proximal end. Various cross-sections are disclosed. In an alternate embodiment, the wire guide comprises a first guiding wire section, a wire loop section and a second guiding wire section, the wire component being folded back on itself to form a generally central wire loop section; and a tubular sheath surrounding the first guiding wire section and the second guiding wire section. The first and second members or guiding wire sections can be connected to a removable handle to facilitate control and maneuverability of the wire guide.

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AMENDED CLAIMS

received by the International Bureau on 20 August 2007 (20.08.07)

What is claimed is:

1. A steerable wire guide (10), comprising:

an elongated composite structure (12) having a longitudinal axis (14), comprising a leading portion (15) and a body portion (18), the leading portion (15) comprising a unitary tip (19) and the body portion (18) comprising a rigid body;

the body portion having a first member (25) and a second member (26), the first member (25) and second member (26) of the body portion being axially slidably movable relative to each other and both connected to the unitary tip (19), such that when the second member (26) of the body portion advances relative to the first member (25) of the body portion, the leading portion (15) is directed in a first direction at an angle (C) relative to the longitudinal axis (14) of the elongated composite structure (12); and when the first member (25) of the body portion advances relative to the second member (26) of the body portion, the leading portion (15) is directed in a second direction, opposite to the first direction and at an angle (D) relative to the longitudinal axis (14) of the elongated composite structure (12);

wherein the first member (25) and second member (26) together have a substantially circular cross section;

characterized in that the steerable wire guide comprises a molded loop (92) at the distal end of the composite structure (12).

2. A steerable wire guide having a longitudinal axis, comprising:

a composite structure (12) comprising a first member (25) and a second member (26) defining a leading portion (15) at a first end of the composite structure (12) and an elongated body portion extending from the first end, wherein the first member (25) and second member (26) are movable relative to each other such that movement of the first member (25) relative to the second member (26) in a first direction advances the leading portion (15), and such that movement of the second member (26) relative to the first member (25) in a second direction retracts the leading portion (15), and

wherein the first and second members (25, 26) have interlocking components such that the first member (25) is configured to be securely but slidably connected to the second member (26).

3. The steerable wire guide of claim 2, wherein the leading portion (15) is substantially between about 5 cm and 10 cm in length.

4. The steerable wire guide of claim 2, wherein the first and second members (25, 26) are in an interlocking relationship holding them together without a casing.

5. The steerable wire guide of claim 2, wherein the leading portion (15) comprises a unitary tip (19) about 7 mm in length.

6. The steerable wire guide of claim 2, further comprising a radiopaque marker on the composite structure (12).

7. The steerable wire guide of claim 2, further comprising a loop (92) located at the leading portion (15) of the composite structure (12).

8. An articulating steerable wire guide having a longitudinal axis (14), comprising:

a composite structure (12) comprising a substantially soft leading portion (40) and a substantially rigid body portion (42), the soft leading portion (40) comprising a tip (19) and the body portion (42) comprising interlocking first and second members (25, 26), the soft body portion (40) being located at the distal end (16) of the composite structure (12) and the rigid portion (42) being located at the proximal end (17) of the composite structure (12); and

wherein the first and second interlocking members (25, 26) are concurrently slidably movable relative to each other, such that when the first and second members (25, 26) slide relative to each other with the first member (25) of the body portion advancing, the leading portion (15) at the distal end of the composite structure (12) bends in a first direction at a first angle (C) relative to the longitudinal axis (14); and when the first and second members (25, 26) slide relative to each other with the

second member (26) of the body portion advancing, the leading portion (15) at the distal end of the composite structure (12) bends in a second direction at an angle (D) relative to the longitudinal axis (14).

9. The steerable wire guide of claim 8, wherein the circumference of the composite structure (12) is about 1 millimeter.

10. The steerable wire guide of claim 8, wherein the leading portion (40) is substantially between about 5 cm and 10 cm in length.

11. The steerable wire guide of claim 8, wherein the tip (19) is about 7 mm in length.

12. The steerable wire guide of claim 8, further comprising a radiopaque marker on the composite structure (12).

13. The steerable wire guide of claim 8, wherein the cross section of the interlocking female and male members (25, 26) is substantially circular.

14. The steerable wire guide of claim 13, further comprising a tubular sheath (94) around the interlocking female and male members (25, 26).

15. The steerable wire guide of claim 8, wherein the tip (19) has a loop (92) configuration.

16. The steerable wire guide of claims 8, wherein the cross section of the interlocking female and male members (25, 26) is substantially rectangular, hexagonal, octagonal or trapezoidal.

17. A steerable wire guide comprising an elongate member (112) having a longitudinal axis (114), a leading portion (115) and a body portion (118), the elongate member (112) further comprising

a wire component comprising a first guiding wire section (125), a wire loop section (92), and a second guiding wire section (125), the wire component being

folded back on itself to form the wire loop section (92) in a generally central part of the wire component, and

a tubular sheath (94) surrounding the first guiding wire section (125) and the second guiding wire section (126) to form the body portion (40, 42) of the elongate member (112), and the wire loop section of the wire component constituting the leading portion (115) of the elongate member (112);

the first and second guiding wire sections (125, 126) being movable relative to each other and with respect to the tubular sheath (94) such that:

relative distal movement of the first guiding wire section (125) with respect to the second guiding wire section (126) directs the leading portion (115) in a first direction (121) at an angle (C) relative to the longitudinal axis (114),

relative distal movement of the second guiding wire section (126) with respect to the first guiding wire section (125) directs the leading portion (115) in a second direction (122) different from the first direction (121),

concurrent distal movement of the first and second guiding wire sections (125, 126) moves the leading portion (115) in a third direction (123), and

concurrent proximal movement of the first and second guiding wire sections (125, 126) moves the leading portion (115) in a fourth direction (124)opposite to the third direction (123);

wherein the first direction (121) is away from a first side of the longitudinal axis (114) and the second direction (122) is away from a second side of the longitudinal axis (114), the first side generally being opposite the second side,

characterized in that a part of the loop section (92) is ground smaller in one portion of the wall (93) of the wire loop section (92).

18. The steerable wire-guide of claim 17, further comprising a closure member (54) closing the wire loop section (92).

STATEMENT UNDER ARTICLE 19(1), REGARDING
AMENDMENT UNDER ARTICLE 19, IN RESPONSE TO
INTERNATIONAL SEARCH REPORT AND WRITTEN OPINION

In response to the INTERNATIONAL SEARCH REPORT and WRITTEN OPINION both mailed 14 June 2007 (14/06/2007), new claims are submitted herewith.

The amendments combine Claim 9 as filed, against which no prior art was applied, with Claim 1 as filed; combine Claim 28 as filed, against which no prior art was applied, with Claim 26 as filed; place two independent claims in two-part form, as suggested in the Written Opinion; and add reference signs in parentheses to the claims, as suggested in the Written Opinion.

It is submitted that the new claims have novelty, inventive step, industrial applicability, and patentability.