

US005792044A

United States Patent [19]

[11] Patent Number: **5,792,044**

Foley et al.

[45] Date of Patent: **Aug. 11, 1998**

- [54] **DEVICES AND METHODS FOR PERCUTANEOUS SURGERY**
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- [73] Assignee: **Danek Medical, Inc.**, Memphis, Tenn.
- [21] Appl. No.: **620,933**
- [22] Filed: **Mar. 22, 1996**
- [51] Int. Cl.⁶ **A61B 1/04**
- [52] U.S. Cl. **600/114; 600/102; 604/264**
- [58] Field of Search **600/102, 114, 600/171; 604/264, 164, 167, 169**

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[57] ABSTRACT

Devices and methods for performing percutaneous spinal surgery under direct visualization and through a single cannula are shown. A device (10) is provided which includes an elongated cannula (20) having a first inner diameter (D₁) and an outer diameter (D_O) sized for percutaneous introduction into a patient. The cannula (20) defines a working channel (25) between its ends (21, 22) which has a second diameter (D₂) equal to the diameter (D₁) of the cannula sized for receiving a tool therethrough. An elongated viewing element (50) is engageable to the cannula (20) adjacent the working channel (25), preferably by a fixture (30). The fixture (30) includes a housing (31) attachable to the proximal end (22) of the cannula (20) that defines a working channel opening (35) which is in communication with the working channel (25). The housing (31) also defines an optics bore (60) adjacent the working channel opening (35). In certain embodiments, the fixture (30) supports the viewing element (50) for translation and/or rotation within the optics bore (60) along the longitudinal axis of the bore, and for rotation of the housing (31) relative to the cannula (20) so that the longitudinal axis of the optics bore (60) will rotate about the longitudinal axis of the working channel (25). Methods are also provided for performing spinal surgeries percutaneously with direct visualization and without the requirement for a fluid-maintained workspace.

37 Claims, 7 Drawing Sheets

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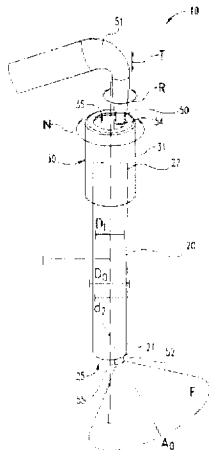
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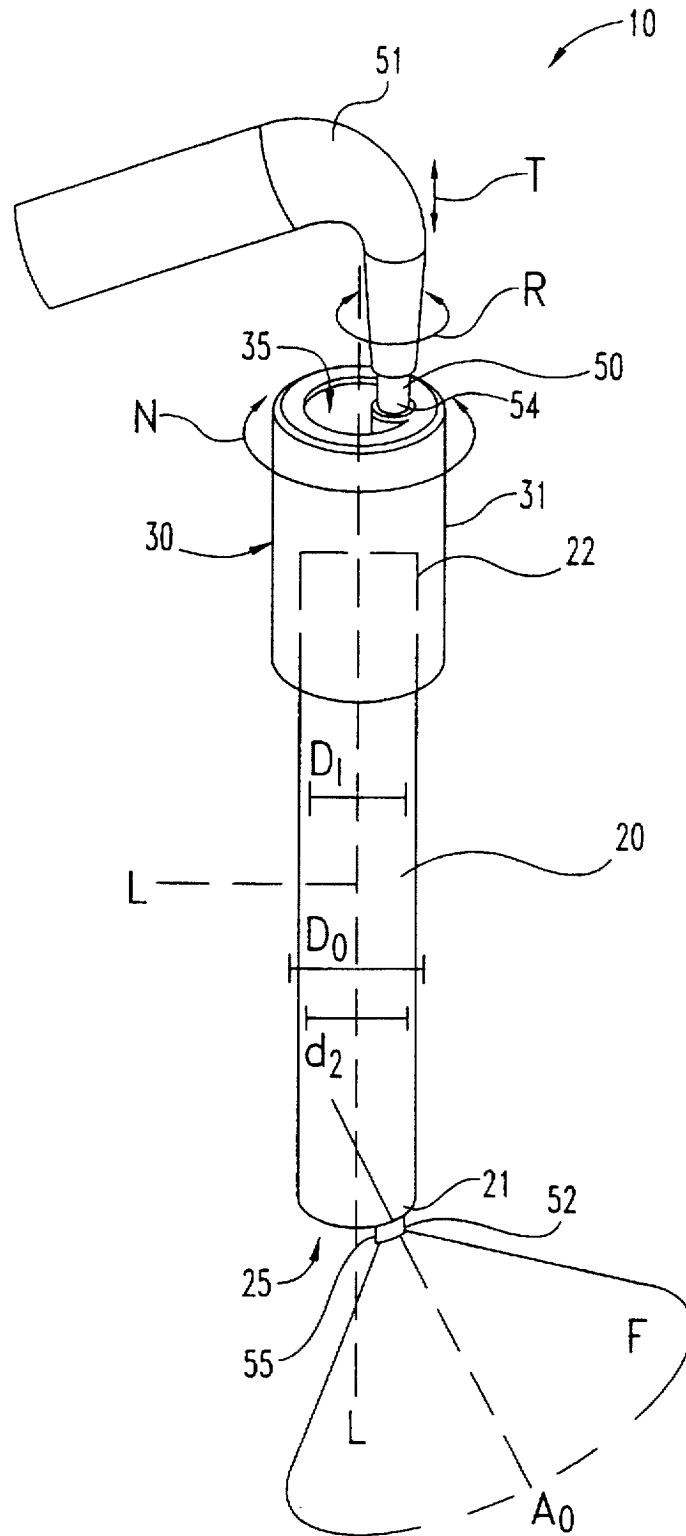


Fig. 1

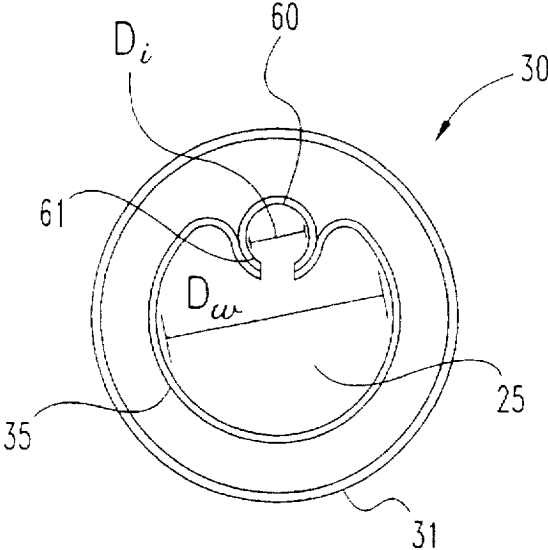


Fig. 2

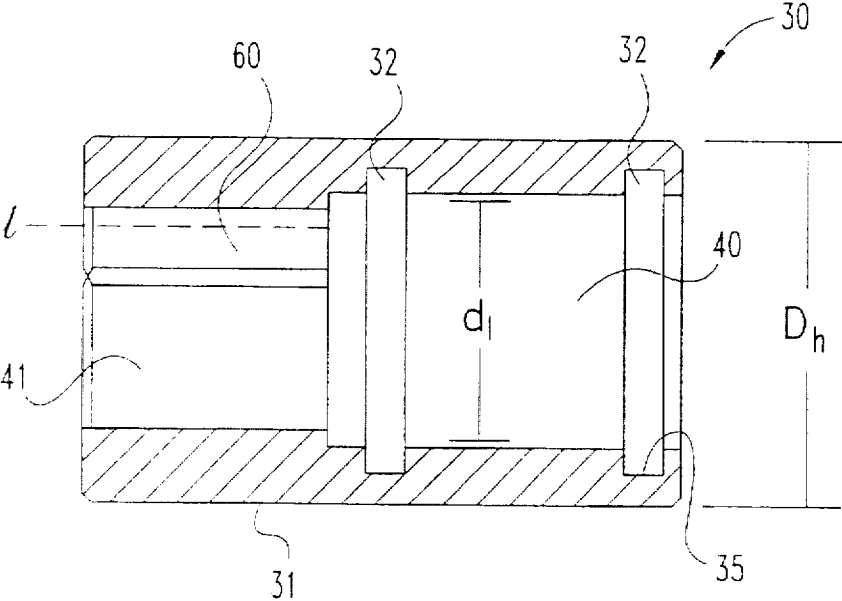


Fig. 3

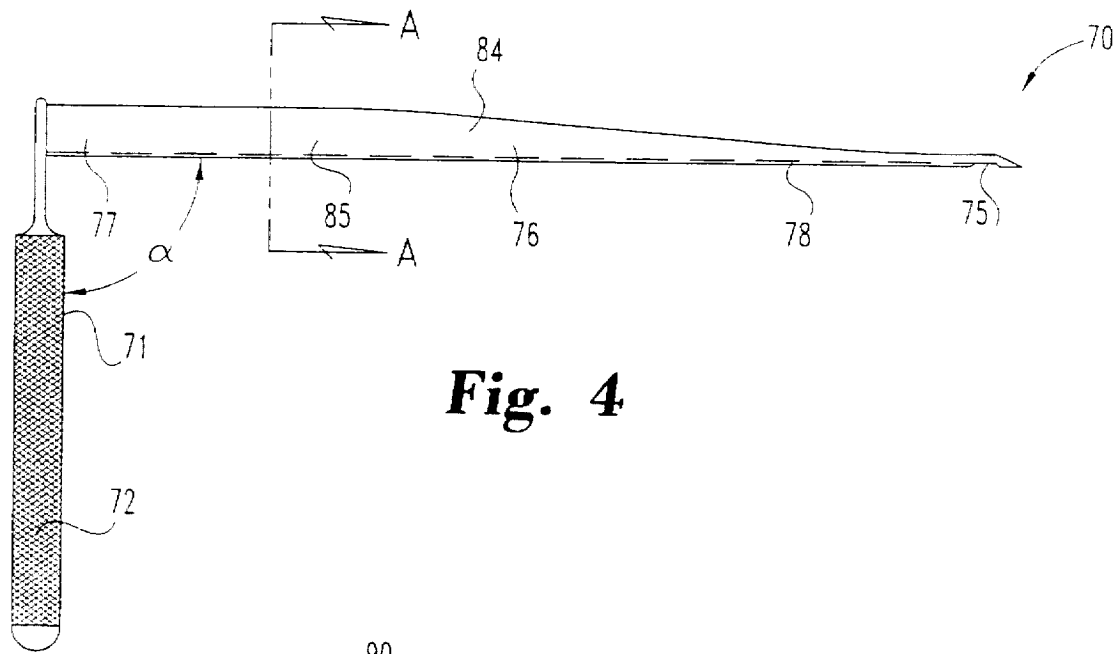


Fig. 4

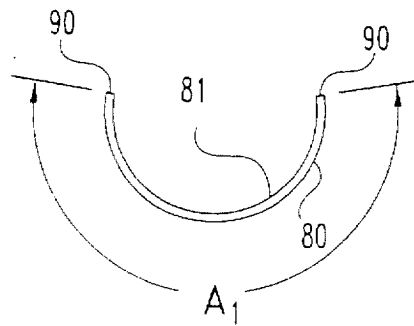


Fig. 4A

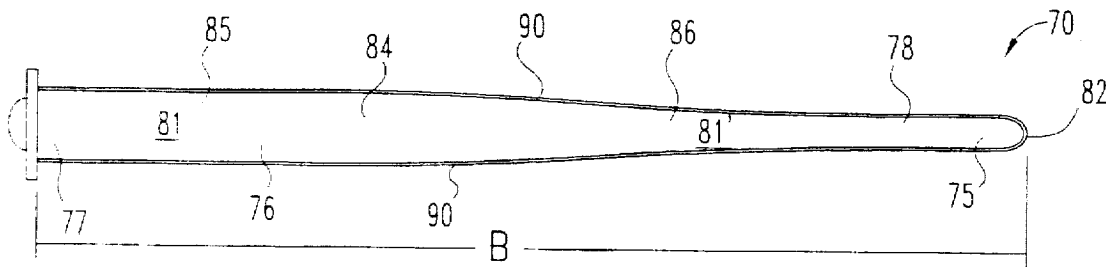


Fig. 5

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