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Steen et al.

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(54) **FLEXIBLE TUBING WITH BRAIDED SIGNAL TRANSMISSION ELEMENTS**

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(57) **ABSTRACT**

A flexible tubing includes a wall provided with a plurality of braided elements forming a braid within the wall of the tube. The braided elements include one or more signal transmitting elements and one or more metallic or non-metallic structural elements having structural properties different from the signal transmitting elements. The signal transmitting elements may be conductive wires, e.g., a sensor conductor or thermocouple, or optical fibers. Additionally, a combination of conductive wires and optical fibers may be provided within the braid. The structural elements preferably provide a degree of torsional stiffness, kink resistance, or luminal rigidity to the catheter which is different than would otherwise be provided solely with one or more signal transmitting elements. The tubing wall is preferably a cross-linking polymer, such as polyimide matrix. In manufacture of the tubing, one or more layers of the polymer are coated on a mandrel and permitted to cure to form an inner layer of the tubing. The braid is then woven about the inner layer. Then, one or more layers of the polymer are coated over the braid and inner layer and permitted to cure to form an outer layer of the tubing which preferably forms a cross-linked and adhesive bond to the inner layer and provides a relatively homogenous structure.

36 Claims, 5 Drawing Sheets

