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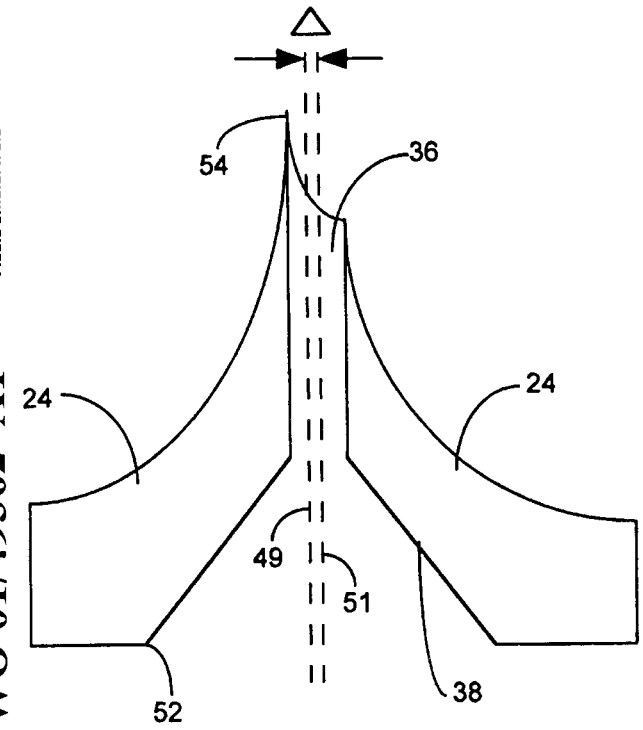
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(54) Title: METHOD OF FORMING VERTICAL, HOLLOW NEEDLES WITHIN A SEMICONDUCTOR SUBSTRATE



(57) Abstract: A method of forming a needle includes the step of anisotropically etching a channel into the back side of a semiconductor substrate. The front side of the semiconductor substrate is then isotropically etched to form a vertical axial surface surrounding the channel. The resultant needle has an elongated body formed of a semiconductor material. The elongated body includes an axial surface positioned between a first end and a second end. The axial surface defines a channel between the first end and the second end. In one embodiment, the first end has a sloping tip with a single circumferential termination point.

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