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(54) **MICROMECHANICAL POSITIONAL STATE SENSING APPARATUS METHOD AND SYSTEM**

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G01R 27/08 (2006.01)

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See application file for complete search history.

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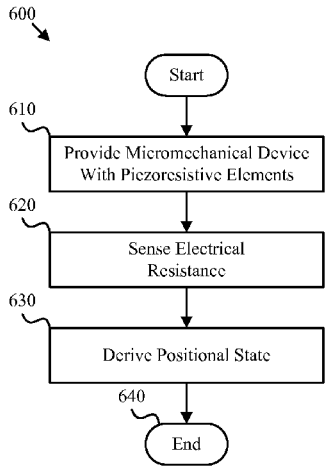
(57) **ABSTRACT**

A micromechanical device may include one or more piezoresistive elements whose electrical resistance changes in response to externally or internally induced strain. The present invention leverages the piezoresistive properties of such devices to sense the positional state of the device. A sensing circuit may be integrated into the device that senses an electrical resistance of at least a portion of the micromechanical device and provides information regarding the positional state of the micromechanical device. The micromechanical device may be a compliant device that includes relatively flexible members such as mechanical beams or ribbons. The positional states may be continuous positional states (such as the position of an actuator) or discreet positional states (such as the positional state of a bistable memory device). In certain embodiments, the micromechanical device is a threshold detector that latches to a particular stable configuration when an applied force exceeds a selected value.

8 Claims, 5 Drawing Sheets