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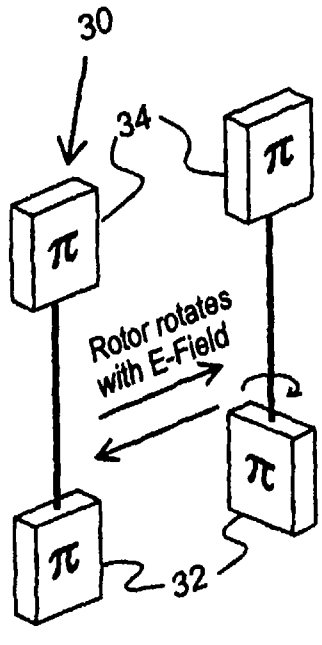
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(54) Title: BISTABLE MOLECULARR MECHANICAL DEVICES WITH A BAND GAP CHANGE ACTIVATED BY AN ELECTRIC FIELD FOR ELECTRONIC SWITCHING, GATING AND MEMORY APPLICATIONS.



(57) Abstract: Molecular systems are provided for electric field activated switches, such as a crossed-wire device or a pair of electrodes to which the molecular system is linked by linking moieties. The crossed-wire device comprises a pair of crossed wires that form a junction where one wire crosses another at an angle other than zero degrees and at least one connector species connecting the pair of crossed wires in the junction. The connector species comprises the molecular system, which has an electric field induced band gap change, and thus a change in its electrical conductivity, that occurs via one of the following mechanisms: (1) molecular conformation change; (2) change of ex-tended conjugation via chemical bonding change to change the band gap; or (3) molecu-lar folding or stretching. Nanometer-scale reversible electronic switches are thus pro-vided that can be assembled easily to make cross-bar circuits, which provide memory, logic, and communication functions.

WO 02/080290 A3