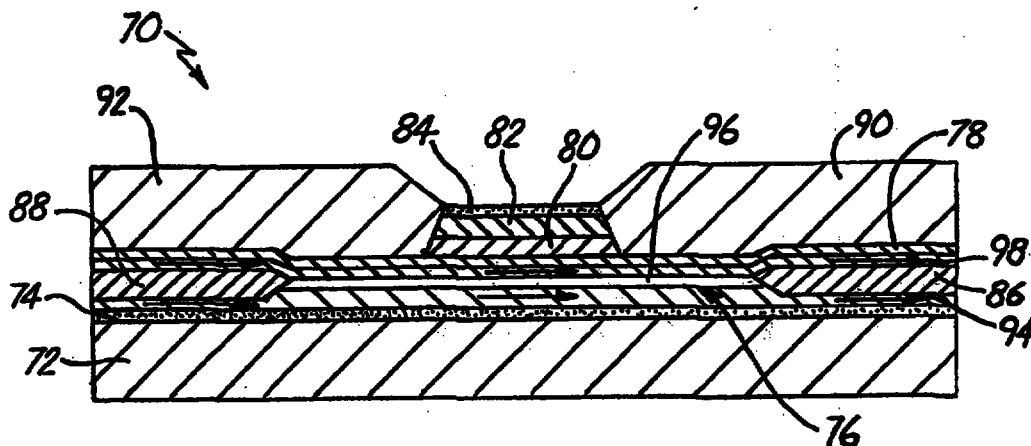




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(54) Title: **SPIN VALVE SENSOR WITH SPECULAR ELECTRON SCATTERING IN FREE LAYER**

(57) Abstract

A spin valve sensor (70) is disclosed, comprising a ferromagnetic free layer (76), a ferromagnetic pinned layer (80), a layer of non-ferromagnetic material (78) positioned between the free layer (76) and the pinned layer (80), and an antiferromagnetic pinning layer (82) positioned adjacent to the pinned layer (80) such that the pinning layer (82) is in direct contact with the pinned layer (80). The free layer (76) comprises a multi-layer stack including a non-magnetic insulating spacer (96) positioned between a first and a second ferromagnetic sublayer (94 and 98). The non-magnetic insulating spacer (96) provides a specular electron scattering effect. The first and the second ferromagnetic sublayers (94 and 98) each have passive end regions separated by a central active region. The spin valve sensor (70) further includes bias means (86 and 88) positioned between the first and the second ferromagnetic sublayers (94 and 98) in the passive end regions. The bias means (86 and 88) produces a longitudinal bias in the passive end regions of a level sufficient to maintain the active central region of the ferromagnetic sublayers (94 and 98) in a single domain state.