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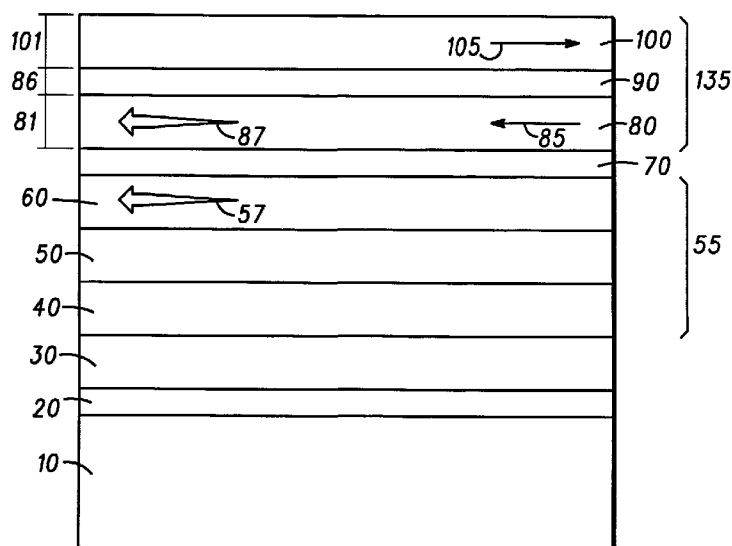
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(54) Title: MAGNETORESISTANCE RANDOM ACCESS MEMORY FOR IMPROVED SCALABILITY



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(57) Abstract: A scalable magnetoresistive tunneling junction memory cell (5) comprising a fixed ferromagnetic region (55) having a magnetic moment vector fixed in a preferred direction in the absence of an applied magnetic field, an electrically insulating material (70) positioned on the fixed ferromagnetic region to form a magnetoresistive tunneling junction, and a free ferromagnetic region (135) having a magnetic moment vector oriented in a position parallel or anti-parallel to that of the fixed ferromagnetic region. The free ferromagnetic region includes N ferromagnetic layers (80,100) that are anti-ferromagnetically coupled, where N is an integer greater than or equal to two. The number N of ferromagnetic layers can be adjusted to increase the effective magnetic switching volume of the MRAM device.



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