LONGITUDINALLY BIASED MAGNETORESISTIVE SENSOR HAVING A CONCAVE SHAPED ACTIVE REGION TO REDUCE BARKHAUSEN NOISE BY ACHIEVING A SUBSTANTIALLY SINGLE MAGNETIC DOMAIN STYLE

ABSTRACT OF THE DISCLOSURE

A magnetoresistive ("MR") sensor constructed with a concave shaped edge in order to provide an effective longitudinal bias field in the center of the active MR element sufficient to obviate multi-domain states and concomitant Barkhausen noise. Utilizing the concave shape proposed herein, the "stripe height" of the element is at a minimum in the center of the active region and increases toward the off-track boundary. In a preferred embodiment, a substantially constant effective longitudinal bias field may be obtained throughout the active MR element if the stripe height increases as an exponential function of the square of the off-track distance. The principles of the present invention are likewise applicable to use in spin valve ("SV") and other giant magnetoresistive ("GMR") sensors.

FIGURE 4

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