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(54) Title: MAGNETORESISTIVE ELEMENT HAVING HIGH OUT-OF-PLANE SENSITIVITY

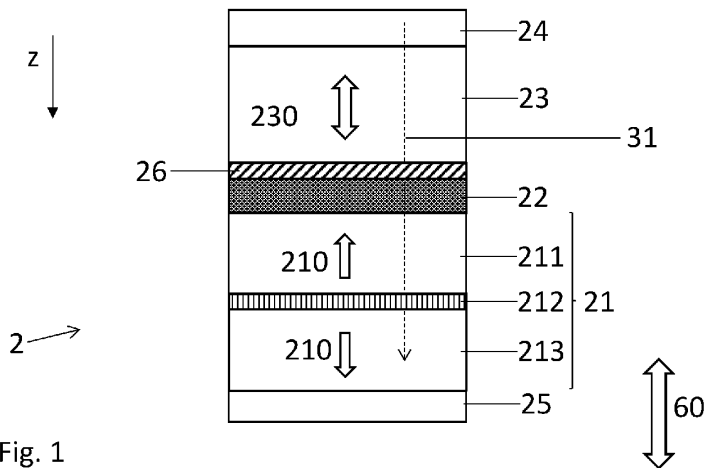


Fig. 1

(57) Abstract: The present disclosure concerns a magnetoresistive element comprising a reference layer (21) having a reference magnetization (210) oriented out-of-plane; a sense layer (23) having a sense magnetization (230) comprising a vortex configuration stable under the presence of an external magnetic field (60) and reversibly movable in a direction out-of-plane relative to the reference magnetization when the external magnetic field (60) varies in a direction out-of-plane; and a tunnel barrier layer (22) between the reference layer and the sense layer. The sense layer has a thickness smaller than 200 nm. The sense layer (23) comprises a ferromagnetic material configured such that the sense magnetization is between 300 and 1400 emu/cm<sup>3</sup> and such that the sense layer (23) has a perpendicular magnetic anisotropy field that is greater than 1 kOe (79.6x10<sup>3</sup> A/m). The present disclosure further concerns a magnetoresistive sensor comprising a plurality of the magnetoresistive element.

[Continued on next page]

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