

[54] **FERROMAGNETIC TUNNEL JUNCTION,
MAGNETORESISTIVE ELEMENT AND
MAGNETIC HEAD**

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[73] Assignee: **TDK Corporation**, Tokyo, Japan

[21] Appl. No.: **933,347**

[22] Filed: **Sep. 19, 1997**

[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**⁶ **G11B 5/39; G11C 11/00;**
H01L 41/12

[52] **U.S. Cl.** **360/113; 257/421; 365/158**

[58] **Field of Search** 360/113; 365/158;
257/421

[57] **ABSTRACT**

This invention is directed to a ferromagnetic tunnel junction, an MR element and a magnetic head. A ferromagnetic tunnel junction is constituted by sequentially laminating a first ferromagnetic film, an insulating film and a second ferromagnetic film. These are laminated on an appropriate insulating substrate. The present invention is characterized in that the barrier potential of the insulating film is set within a range of 0.5 to 3 eV. A ferromagnetic tunnel junction with which a high MR ratio can be achieved with good reproduction characteristics is provided.

[56] **References Cited**

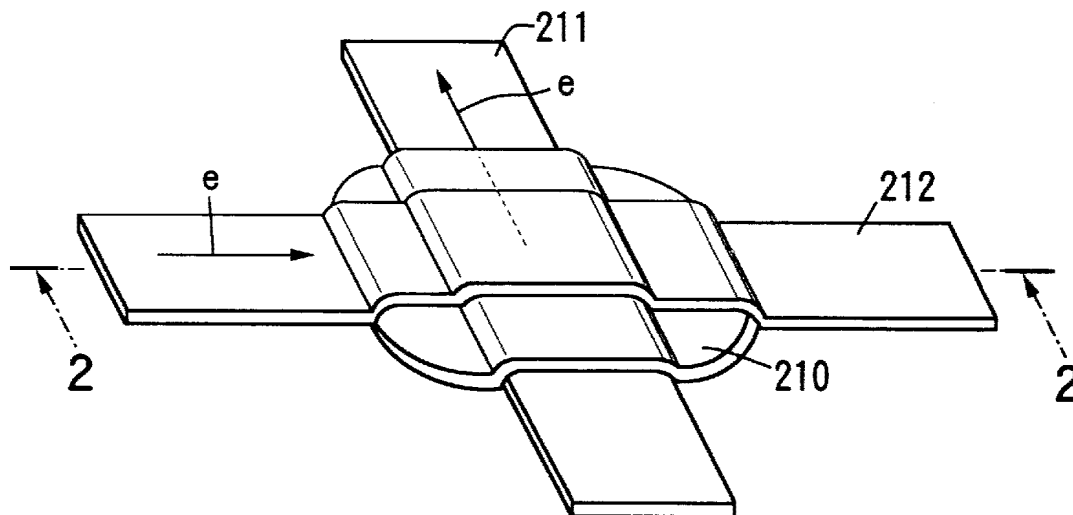
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52 Claims, 27 Drawing Sheets



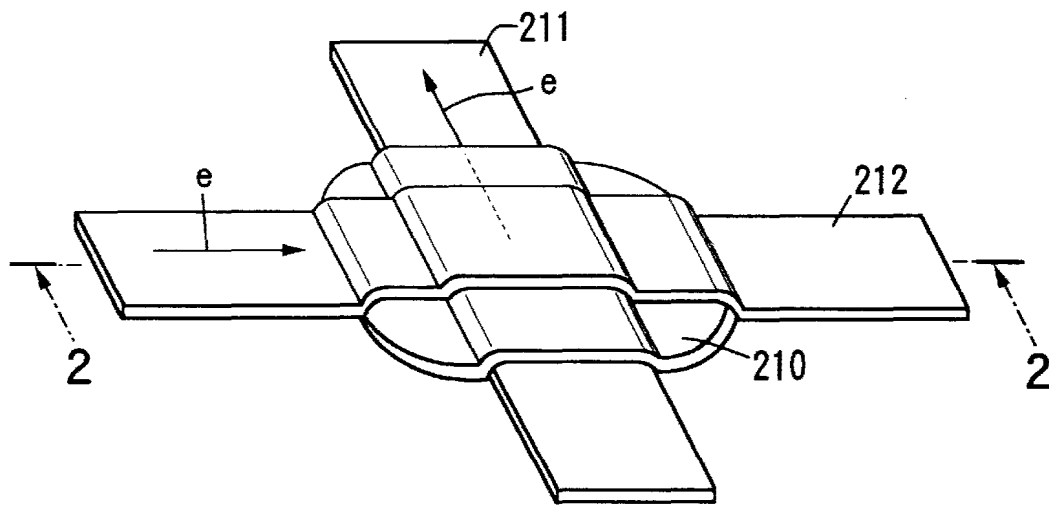


FIG. 1

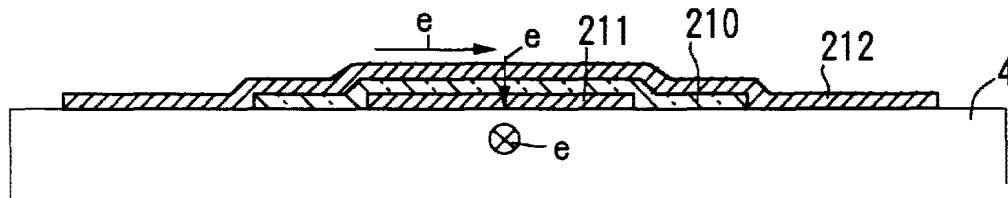


FIG. 2

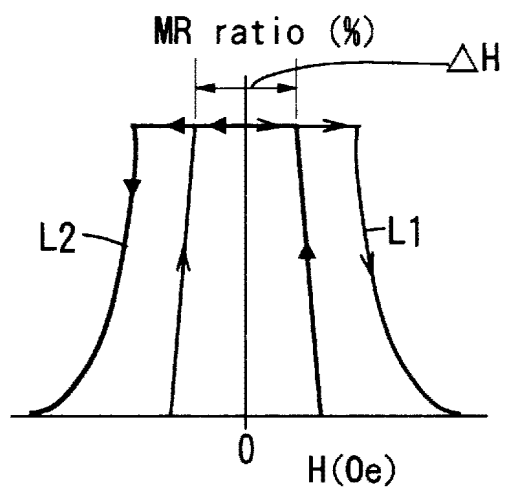


FIG. 3

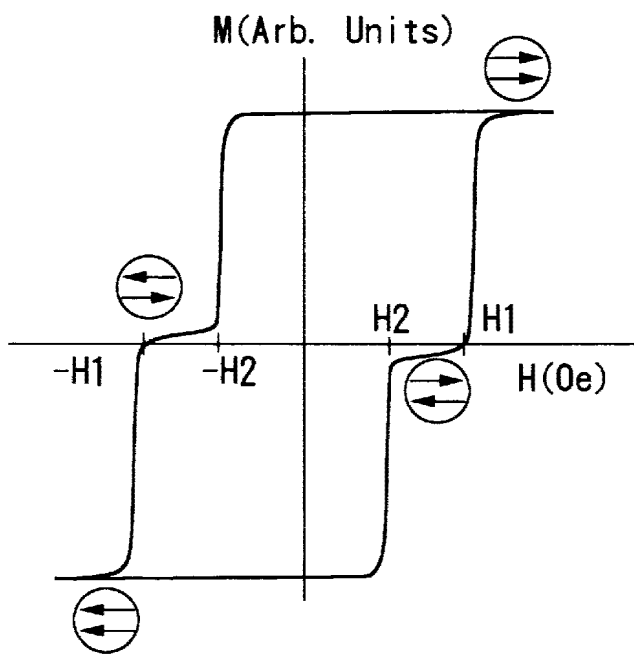


FIG. 4

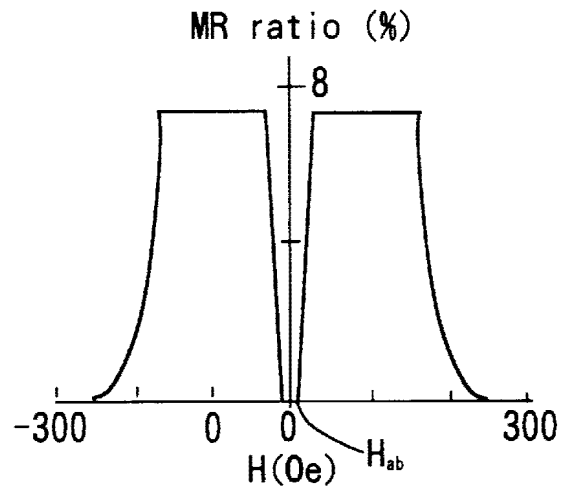


FIG. 5

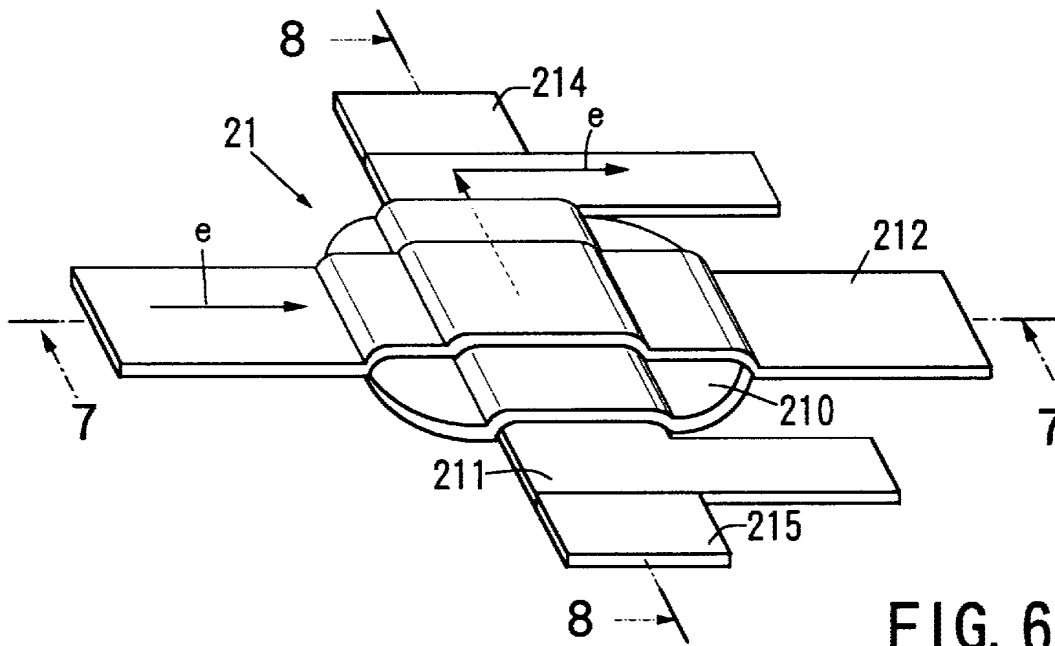


FIG. 6

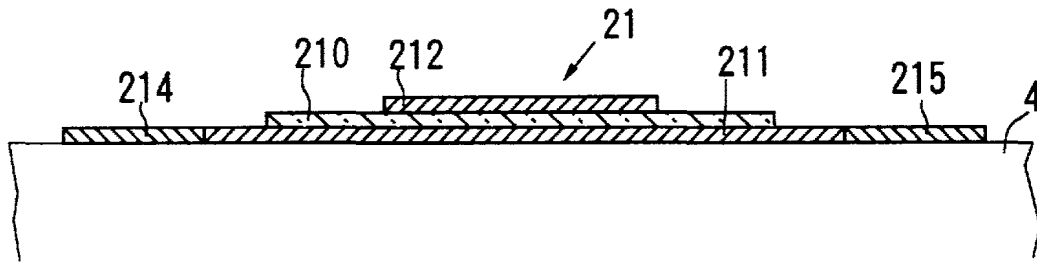


FIG. 7

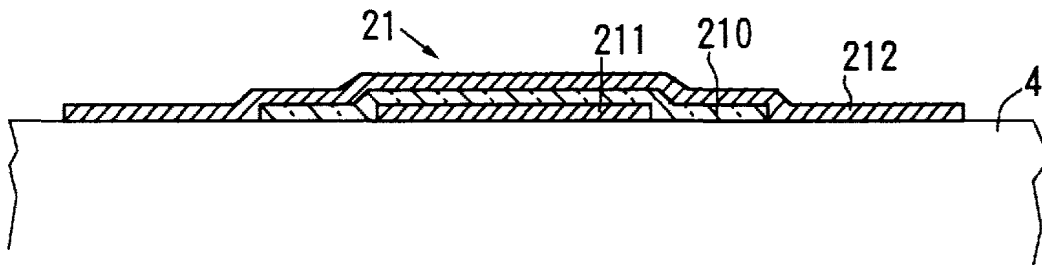


FIG. 8

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